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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

LUMLEIAN LECTURES on the Muscular Mechanism of Respiration and its Disorders. By Sir CHARLTON BRISCOE, Bart., M.D., F.R.C.P. Lecture II.—(*Illustrated*) 749

ORIGINAL ARTICLES.

Light Treatment in Surgical Tuberculosis. By Sir HENRY GAUVAIN, M.D., M.Ch.—(*Illustrated*) 754

Glycosuria Complicated by Gall-stones. By C. D. SHAPLAND, M.B., B.S.—(*Illustrated*) 758

CLINICAL AND LABORATORY NOTES.

Two Cases of Abdominal Abscess. Illustrating the Value of Antiseptics. By Sir JOHN O'CONOR, K.B.E., M.D. 759

A Case of Iodism in which Œdema Glottidis necessitated Tracheotomy. By N. W. SNELL, M.D., and J. H. SAVIN, F.R.C.S. .. 759

MEDICAL SOCIETIES.

B.M.A. Conference: Research and Animal Experimentation 760

Liverpool Medical Institution: Psoriasis 761

REVIEWS AND NOTICES OF BOOKS.

Lister as I Knew Him. By John Rudd Leeson, M.D. 762

The Pathology and Treatment of Diabetes Mellitus. By George Graham, M.D. 762

Clinical Pediatrics. By Prof. John Lovett Morse 763

The Theory and Technique of Psycho-analysis. By Sandor Ferenczi, M.D. 763

The Ego and the Id. By Sigm. Freud, M.D. 763

Practical Nursing. By E. M. and A. R. Hassard... 764

Cavernous Sinus Thrombophlebitis. By Wells P. Eagleton, M.D. 764

Readable Physiology and Hygiene. By J. Argyll Campbell, M.D., D.Sc... 764

REPORTS AND ANALYTICAL RECORDS.

Sistomensin—Stock's Medicinal Brandy (Three Star) 764

THE LISTER CENTENARY.

Lister's Contributions to Physiology. By Sir CHARLES SHERRINGTON, O.M., F.R.C.P. 743

Lord Lister as a Pathologist and Bacteriologist. By Prof. WILLIAM BULLOCH, M.D., F.R.S. 744

Lister as Surgeon. By Sir BERKELEY MOYNIHAN, Bart., P.R.C.S. 746

On a New Method of Treating Compound Fracture, Abscess, etc.: with Observations on the Conditions of Suppuration. By Prof. JOSEPH LISTER, F.R.S.—(*With portrait*) . 773

Memories of a House Surgeon. By Sir STCLAIR THOMSON 775

A Domestic Survey. By Sir Humphry Rolleston, Bart. 780

The Conquest of Sepsis. By Sir JOHN BLAND-SUTTON, Bart. 781

The Centenary Celebrations 782

Celebration at King's College Hospital: Address by Sir Watson Cheyne... 782

The Prime Minister's Reception: Lister and France. Lister and Germany 784

Commemoration Service at St. Peter's, Upton Cross 785

Reception at the Royal College of Surgeons of England 785

The Dinner in the City to the Delegates 785

Memorial Service in Westminster Abbey..... 786

Celebrations at Glasgow.. 768

LEADING ARTICLES.

LISTER 765

PRISONS AND PRISONERS .. 765

ENCEPHALITIS, HERPES, AND ALLIED DISEASES . 766

ANNOTATIONS.

Motorists and Third Party Risks 767

Recent Work on Convulsions 768

The Story of the Lucifer .. 768

A New Partial Vaccine against Gonorrhœa 768

Witchcraft and Medicine .. 769

Form and Function 769

Control of Tuberculosis in U.S.A. 770

New Methods of Treating Boils and Cold Abscesses 770

The late Dr. F. B. Power 770

The British Institute of Philosophical Studies .. 771

Luminous Bacteria 771

MODERN TECHNIQUE IN TREATMENT.

CCXVIII.—Treatment of the Functional Dyspepsias. By ROBERT HUTCHISON, M.D. 771

THE SERVICES.

Royal Naval Medical Service—Royal Army Medical Corps—Indian Medical Service 786

CORRESPONDENCE.

British Institute of Philosophical Studies .. 787

Tests for Drunkenness (Dr. H. W. Southgate).. 788

The Penalisation of the Tuberculous (Dr. P. C. Varrier-Jones) 788

Anæsthetic Ether (Dr. H. E. Laws)..... 788

Ophthalmic Benefit (Dr. J. Myles Bickerton, Mr. J. H. Sutcliffe and Mr. F. T. Gregg)..... 789

PUBLIC HEALTH SERVICES.

School Medical Service .. 791

Infectious Disease in England and Wales 791

SPECIAL ARTICLES.

Berlin: Compulsory Insurance for Doctors 792

Scotland: The Aberdeen Joint Hospitals Scheme. 792

Medicine and the Law: Alleged Negligence in Certification under the Lunacy Act—Defence of Epilepsy on Murder Charge 793

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Washington House Convention—Sandstone Workers and Phthisis—Nursing Homes (Registration) Bill—Midwives and Maternity Homes (Scotland) Bill—Sale of Food and Drugs Bill ... 794

House of Commons: Outbreak of Small-pox in Dundee—Pensioners and Light Metal Limbs.—Relieving Officers and Medical Relief — Committee on Registration of Opticians—The New Food Preservative Regulations 797

MEDICAL NEWS.

University of Durham 799

University of Liverpool ... 799

University of Manchester.. 799

University of Dublin 799

Fellowship of Medicine .. 767

Birmingham Hospitals .. 791

Church of Scotland Deaconess Hospital 772

Newcastle-upon-Tyne Motor Accidents 767

Royal Northern Hosp. 764

District Nursing in London 786

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James Mackenzie Institute for Clinical Research ... 800

Lister Centenary Exhibits. 800

David Lewis Northern Hosp. 800

Typhoid Fever in Montreal 800

Liverpool Child Welfare Assoc. 800

British Social Hygiene Council 800

A Leeds Poor-law Hospital 801

Donations and Bequests.. 801

The late Dr. A. G. Wilkins 801

NOTES, COMMENTS, AND ABSTRACTS.

The Chronic Rheumatic Diseases. By CAREY F. COOMBS, M.D., F.R.C.P. —(*Concluded*)..... 802

A Scheme for Coping with Influenza Epidemics.... 803

Occupational Analysis 804

Arsenic and Apples.....—... 804

Sollux Papers on U.V. Therapy 804

Medical Diary 801

Appointments.—Vacancies 801

Births, Marriages, Deaths.. 802

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LISTER'S CONTRIBUTIONS TO PHYSIOLOGY.

By SIR CHARLES SHERRINGTON, O.M., F.R.C.P.,

WAYNEFLETE PROFESSOR OF PHYSIOLOGY, UNIVERSITY OF OXFORD; SOMETIME PRESIDENT OF THE ROYAL SOCIETY.

THE invitation has been extended to me to offer a few words on the contributions made by Lister to physiology. Lister's very earliest scientific papers were all physiological. Indeed, he may be said to have entered by way of physiology his surgical researches which were to achieve so much.

His first paper was on the Contractile Tissue of the Iris. Work done with the microscope, which he used for the study of function rather than of form alone, it appeared in 1853, in the first number of the first volume of the now well-known *Quarterly Journal of Microscopical Science*. Lister was then 25 years of age, and that his maiden voyage of discovery should employ the microscope was but natural in the son of his father, Joseph Jackson Lister, that remarkable man, who leaving school at the age of 14 for the business he conducted so successfully, yet found time to cultivate optics to such purpose as to be the main giver to the world of the achromatic microscope. Lister's earliest paper, this on the iris, supplied the first full and correct description of the radiating muscle dilating the pupil. It thus made a lasting mark upon its subject.

Lister's second paper, of a few months later, dealt likewise with involuntary muscle; this time in the skin, where Koelliker had recently discovered the arrector muscles of the hairs; and this discovery Lister confirmed and in several respects extended.

ENTHUSIASM AND RESTRAINT.

We may be struck by the remoteness of these Lister's first themes both from surgery and from actual practice—they are simply academic. I think we have to picture him a young man to whom what really mattered was engagement in research, caring less what in particular the research might be; a young man so ardently curious about nature, especially animate nature, that he turned enthusiastically to the problem that came first to hand. And these papers in the simplicity of their text seem to reflect the Quaker upbringing of Lister's home. There is already that sobriety of expression which, characteristic of Lister all his life, made yet the more impressive his own self-restrained statements of his great results later on. No man in his career had more excuse for, more justification for, hyperbole of phrase than had Lister, and no man ever indulged in hyperbole less than did he. It is therefore of significance when the young author allows himself an expansive adjective, as when he writes "the grand discovery of plain muscle-cells," "the beautiful muscle of the iris." We feel these expressions to be, from him, not mere phrases. An abiding interest of these youthful papers is their revelation of attributes in Lister's, so to say, original nature; and salient among these attributes are penetrative and faithful observation, catholic enthusiasm for research, a restless testing of authority by observed fact, and unhesitating self-submission of opinion to whatever the truth might assert.

His third paper, still physiological and on the same theme, smooth muscle, followed some four years later. The cellular nature of that tissue had been denied; Lister returned to its further proof, and furnished it overwhelmingly. Forty years afterwards the then foremost authority on this tissue wrote of this paper of Lister's as being still not only abreast but in several respects ahead of other subsequent papers on its subject.

This work proved, however, to be Lister's farewell contribution to that particular theme. To him by then much had happened and was happening to compel his main interest elsewhere. His scientific enthusiasm had indeed definitely orientated itself toward a chosen quest in the great field of the unknown. His spirit of inquiry had found a direction of compelling interest to it; a lode-star of overpowering attraction. In his own words, written to his father, he had fallen in love with surgery. And with that widely detailed and highly technical art and calling prospectively spread before him, the genius within him impelled him to study not so much this or that particular skill or difficulty, but the fundamental and all-pervading process of inflammation itself as being the prime and central problem for investigation as a surgeon.

INFLAMMATION AND RELATED STUDIES.

Henceforward his physiological researches were merely side offshoots from that pathological study engaging his main thought. Thus his paper on the nervous control or arteries, distinguishing between the immediately local and the more distant effects of a stimulus, and especially of an irritant stimulus upon the blood-vessels. The local effect, he concluded, was independent of the nervous system, but with a surrounding zone of effect mediated by nerve, a finding closely suggestive of present-day views. Another paper was that on the pigment cells of the frog's skin, the cells on which the animal's well-known colour changes depend. Lister concluded the shift of pigment to be an active shift of the pigment grains within the cells themselves, and the way in which he consolidated and marshalled his evidence for that is a striking instance of his thoroughness as an investigator. There is little doubt that from detailed study of these pigment cells Lister gained much of that vivid and intimate conception of cell-life struggling against irritant agents which informed and directed his surgical strategy afterwards.

Another physiological investigation by him concerned the inhibitory nature of certain visceral nerves. He wrote, "I have been led to make an experimental inquiry into this 'so-called inhibitory agency' because it appears to me to have an intimate bearing upon the question how inflammation is developed through the medium of the nervous system at a distance from an irritated part." His main conclusion was that inhibition resulted from more energetic action of those same nerves which when working mildly produce increased action. Then, and still more closely related to his pathological inquiries, followed two papers on clotting of blood, confirmatory, as he himself remarks, of his conclusions arrived at about inflammation.

THE MERIT OF LISTER'S EARLY RESEARCH.

These papers and the year 1862 conclude practically the tale of Lister's researches devoted directly to physiology. Of them the greater share were offshoots from his study of inflammation. They all possess the interest of revealing to us the features of their author in his earliest research career. Conspicuous in them is capacity for noting detail and the rarer power of sifting out from it the broader meanings. Another of their qualities is a voracious appetite for observing for himself phenomena which many would be content to take on trust from the excellent descriptions already given by others. Lister was satisfied by nothing less than seeing for himself, and his eye never staled. A further quality is their scientific courage which feared nothing except to miss the truth. Moreover, even at this stage, though he might appear engaged on diverse problems, he was in fact centred upon one, of which from his point of view the several were but several aspects. Thus these early papers show that in reality quite early in his career he had not only found but had whole-heartedly flung himself upon what was to be his life-work and his life's problem—a problem we may almost subsume under the one broad term "inflammation." That was the study which he was to follow

* A series of three discourses delivered in the Robert Barnes Hall of the Royal Society of Medicine on April 6th.

to a practical solution so magnificently, and in doing so exhibit what these earlier paper had less opportunity for showing, the splendid power of establishing and systematically following to its consequences a great generalisation. Hence from these earlier researches we can see spring that triumphant career of experimentation and observation, in the laboratory and the ward, which, with a really surprising speed of mastery, winged Surgery for that which she is to-day, a far-flighted angel of healing the civilised world over.

ENLARGED SCOPE OF PHYSIOLOGY.

But these papers, valuable though they are, whose features we have been examining, far from exhaust the gift made by Lister to physiology. In addition to and beyond them he enriched it with the contribution of enhanced means towards its most cherished aims. He put into the hands of physiology for all time to come a superlative refinement of its method and made possible observations otherwise impossible. Sir Berkeley Moynihan has eloquently insisted on the importance of surgery as a means to discovery. In physiology, how could Pavlov have achieved his epoch-opening study of the digestive processes except by leaning upon Lister's surgical principles? Or Ferrier initiated his study of localisation of cerebral function except by means of Lister's surgical principles? How could the physiologists of Toronto less than four years ago have bestowed upon diabetic sufferers that merciful remedy insulin, had it not been for the legacy of operative principle and science bequeathed to them and to the whole world by Lister?

And Lister's own words leave us in no doubt as to what a source of rejoicing it was to him that among benefits accruing from his work was this of an enlarged scope and power for physiology and experimental medicine. He dwelt, both in public and in private, upon the need and importance of such experimentation for the progress of knowledge necessary to civilisation. He rejoiced that he had contributed to its power. And, indeed, the experimentalist owes to Lister an instrument of research whose beneficent future the boldest imagination may well halt to set limit to.

And of the gifts to Lister to humanity one which the experimentalist is ever mindful of with especial gratitude is that, while helping man to mastery over disease alike for animal and man, he contributed to free that necessary experimentation from the infliction of pain. Man, sacrificing animal life as he does to satisfy the material needs of human kind, has the right to regard the intellectual need impelling him to animal experimentation as means of saving human and animal-kind from disease, as being justified in doing so. He feels the more jusified in doing so, and takes that step with a clear conscience, because largely owing to Lister it can be taken without inflicting pain or suppuration.

Thus it is that through years to come, after, indeed, it may be that the actual papers contributed to physiology by him may have become matter chiefly for the historian and the antiquarian, Lister will still receive unfailingly his meed of commemoration from the physiologist and experimentalist, and in a manner which to himself would of all ritual and offering have been the most congenial—namely, in their daily observance and trust of methods which he discovered and inculcated, and in their practice for the alleviation and prevention of disease. It is therefore with peculiar gratitude that physiology brings its tribute of admiration and veneration to the memory of one great even among the greatest of the benefactors of humanity, Joseph Lister.

LORD LISTER AS A PATHOLOGIST AND BACTERIOLOGIST.

BY WILLIAM BULLOCH, M.D., F.R.S.,

GOLDSMITHS' COMPANY'S PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF LONDON.

WE are met to commemorate the centenary of the birth of Lord Lister, and I have been asked to address this representative gathering on his contributions to pathological science. Proud as I am of the great honour which has been bestowed on me, I am painfully conscious of my own imperfections and limitations for such a task. My qualifications are twofold. In the first place, I have read all Lord Lister's writings and have made a critical study of some of them, not only to discover their intrinsic merits, but to compare them with similar studies of his predecessors and contemporaries. In the second place, I had the great privilege of knowing Lord Lister for 13 years, and in a manner which, considering the great disparity of our positions was, if I may presume to say so, almost intimate.

As bacteriologist to the British Institute of Preventive Medicine I had to visit Lord Lister, the chairman of the Institute, almost weekly in order to report to him the progress of the work in the antitoxin department. After I left the Institute, he frequently asked me to call upon him to discuss various scientific problems in which he was interested. In this way I was a good deal in his company, and among the younger men of that day I probably saw as much of him as any one else. When I first knew him, in 1895, he was 68, and I frequently saw him down to 1907. I last saw this great man in a bath-chair by the roadside at Walmer on a lovely sunny morning—Dec. 26th, 1909. He was then 82, and was approaching the lonely end of his splendid career. Both then and now he stands out to me as a most impressive personality. I have known very many of the leaders in our profession at home and abroad during the last 30 years, and have no hesitation in placing him *facile princeps medicorum*.

Up till old age he continued to be deeply interested in all medical advances and was almost young and boyish in his enthusiasm. Although leading a busy and strenuous life he was still striving to keep abreast of bacteriological literature which at the time was pouring forth in an unbroken stream. On several occasions I was hours in his company trying to unravel the intricate papers of Ehrlich and Bordet on the nature of hæmolysis or the constitution of diphtheria toxin. Our hour of work finished he would relax into reminiscences of his life and aims, the difficulties he had to contend with, and how he had overcome them. On one such occasion—the date was Oct. 23rd, 1905—he referred in great detail to his work on pigmentation of the frog and on inflammation, and he said to me—I wrote the words down at the time—"if my works are read when I am gone, these will be the ones most highly thought of." These were not the numblings of senility, for he was still alert and fresh, but I took it to mean that he wished to be regarded as a scientist rather than as a surgical craftsman notwithstanding his pre-eminence in the latter branch of human activity. It is therefore a peculiar pleasure to me to have to refer to some of these contributions which he himself valued.

In estimating Lord Lister's scientific work it is essential to remember that he had no properly equipped laboratory as we understand it to-day. His laboratory was his study in his private home, and perhaps the best part of his scientific work was that done in 11, Rutland-street, Edinburgh, during his first stay (1853–1860) in the Northern capital. To this period belong the papers on pigmentation of the frog (1857), the function of the visceral nerves (1858), the coagulation of the blood (1858–1863), and the early stages of inflammation (1857). The construction of his antiseptic system took place mainly in the Glasgow period, 1860–1869, while his chief bacteriological studies are to be referred to the second stay in Edinburgh (1869–1877) when he resided at 9, Charlotte-square.

The hours for his scientific work were early in the morning and far into the night, following a harassing

day of active surgery in private or in hospital. He undertook his experimental work so that he might speak with first-hand knowledge of the themes he had to teach. Many of the problems, although of paramount importance practically, were obscure and complicated. Some were not capable of solution then, others have not yet been definitively resolved.

COAGULATION OF THE BLOOD.

The coagulation of the blood has at all times excited wonderment, and the theories to explain the process have been innumerable and are still being brought forth. In this country very notable advances were made in the eighteenth century by William Hewson, who unfortunately died before he was 35. He proved that the red blood corpuscles were biconcave discs; he discovered the white corpuscles and performed a large number of admirable experiments to explain the process of clotting, although he never quite cleared up the mystery of its nature. His successors in the nineteenth century were not more happy. Coagulation was early studied by Lister as it was constantly being brought to his notice in connexion with closure of the vessels, putrefaction, and secondary hæmorrhage in surgical wounds. When Lister began, the prevailing theory was that of B. W. Richardson, who referred coagulation to the escape of ammonia which was believed in some way to hold the coagulative elements normally in solution. In a long series of experiments conceived and carried out in masterly fashion, Lister showed that the ammonia theory was untenable. He clearly saw the necessity for separating the nature from the cause of coagulation, and while baffled with the former he revealed by his experiments that the latter—the cause of coagulation—is really due to the influence exerted on the blood by the contact, even momentarily, of ordinary matter of some kind. He considered that this contact brings about a reaction between the solid and fluid constituents of the blood so that the corpuscles imparted to the liquor sanguinis the disposition to clot. As regards the cause of clotting it cannot be said that we have materially advanced during the 70 years since the publication of Lister's work.

EARLY STAGES OF INFLAMMATION.

Another basic pathological process which he studied was inflammation. The extraordinary changes which we call inflammation have always attracted attention, and the explanations given constitute a large part of the history of medical doctrines. When Lister began to study inflammation there was already a considerable mass of accurate knowledge on the subject. The older pathological anatomy so ably created by Morgagni and followed up by the French school down to the time of Cruveilhier, was being replaced by the new knowledge which accrued from the discoveries of Schleiden and Schwann. At the time Edinburgh was a great centre of medical activity and a nursery of medical talent. Many of her graduates migrated across the border to attain fame in the arenas of the South. I need only mention names like Richard Bright, Hodgkin, Thomas Addison, C. J. B. Williams, Marshall Hall, and two who had a marked influence on Lister's life at University College and afterwards, I refer to William Sharpey, and the exceedingly able, if eccentric, Wharton Jones. Their work was carried forward by Augustus V. Waller and the little known but highly successful worker William Addison. In the inflammatory process the margination of the leucocytes was taught by C. J. B. Williams and W. Addison in 1841. In 1846 Volnay Waller rediscovered the wonderful process of emigration of leucocytes, previously known to Dutrochet (1827). In a most scholarly manner Wharton Jones summed up all the knowledge on inflammation down to 1846, and himself gained the Astley Cooper Prize in 1850 for his splendid essay on the pathology of inflammation.

When, therefore, Lister began to study the process he was traversing ground already trodden. He early realised, however, that much that had been done concerned the later stages of inflammation, whereas its real essence was most likely to be found by analysing the earliest changes. Examining the frog's web and the bat's wing he took elaborate precautions that they should be in a perfectly healthy condition. By the application of irritants he passed to the study of the morbid, and investigated especially the aggregation of the red corpuscles, their increased adhesiveness, and the structure of the arterioles and capillaries. He found that the capillaries alter in size, but referred the change to something inherent in their elasticity. While admitting the existence of contractility in the capillaries, modern writers have not accepted his explanation. Lister regarded irritants as acting in a twofold manner. The primary effect was a dilatation of the vessels, brought about through the influence of the nervous system and not limited to the *locus* of the irritant. The secondary effect, on the other hand, was the direct outcome of the irritamentum itself in consequence of which the blood becomes altered physically. The red discs become more adhesive, they accumulate in masses, and may bring about a condition of actual stasis. Strange to say, Lister made no reference to diapedesis of the leucocytes and probably missed it altogether. The earlier discovery of Waller had left apparently little impress on the knowledge of the day, so that when Cohnheim described diapedesis in detail in 1867 the discovery was looked upon as something altogether new. It is to Lister's credit that he discussed inflammation from a new point of view, which Cohnheim nine years later carried to a conclusion.

BACTERIOLOGY.

When Lister embarked on his extended study on the cause of suppuration and the complications which follow surgical operations, his previous work on blood and inflammation was a great help to him. He was continually groping for the causes of the surgical disasters which were habitually happening, but light began to peer through the obscurity. This was early during his Glasgow term. In 1865 his attention was directed by a colleague to the work which had been done on fermentation and putrefaction by Pasteur from 1857 onwards. This work came upon him as a revelation, and almost at once he grasped the full significance of the Frenchman's discoveries for surgery. Ten years later he tells us specifically that the work of Pasteur "long since made me a convert to the germ theory, and it was on the basis of that theory that I founded the antiseptic treatment of wounds in surgery."

Although he frequently reiterated his indebtedness to Pasteur it is, I think, a vulgar error to regard Lister as a mere imitator of his great French contemporary. As early as 1861, and before his acquaintance with Pasteur's papers, he was getting near the truth about suppuration, and afterwards he advanced beyond the point where Pasteur had led him. From now on he became ardent in the pursuit of bacteriology. This was about 1870, when the study of microbes had scarcely emerged as a distinct science. At the time there were two conflicting views. The one, supported particularly by the eminent botanist, Ferdinand Cohn, held that bacteria exhibited a constancy in form which might be used as a basis of their classification into genera and species. According to the other view, there is no such morphological stability, but rather a pleomorphism whereby one and the same microbe could assume different forms according to the environment. In his earliest bacteriological work in 1873 Lister ranged himself among the pleomorphists, and it has to be admitted that he suffered shipwreck when he stated that Ehrenberg's and Cohn's classification was "entirely untrustworthy." Lister's mistake was one made by a great many others at that time, and serves but to show how unwary the earlier bacteriologists were of the pitfalls lying in their path. There exists an exceedingly interesting correspondence which passed between Lister and Pasteur on the subject. Pasteur clearly saw where Lister had erred and advised him

to repeat his experiments with added precautions. This Lister did, and profiting by his new experience, became one of the foremost bacteriological technicians and pioneers of his time. So imbued was he with lofty ideals that instead of covering up his tracks he handsomely admitted his error. "Next to the promulgation of truth," he said, "the best thing I can conceive that a man can do is the recantation of a published error." This sentiment was almost exactly that which was given to us sixteen hundred years ago by Celsus, who, however, added that such a confession is suited only to a great genius whose splendour is such as to survive the sacrifice, especially in the performance of a task which is to be handed down for the benefit of posterity as a beacon of truth to warn them against similar errors. From the theory of Cohn and Pasteur it was to be presumed that in some way—at that time unknown—bacteria might be separated from each other and cultivated in a pure state. The great mycologist, Brefeld, early pointed out the necessity of raising pure strains or cultures from one single germ. Lister attempted this, and by unsurpassed technique involving a remarkable understanding of the whole problem he succeeded in obtaining a pure growth of a microbe which he called *Bacterium lactis*, and which was a cause of the so-called lactic fermentation. He grew the microbe in sterile milk and raised a pure strain, constant morphologically and physiologically, from a single bacterial cell. This was possible by the aid of an ingeniously constructed syringe of his own invention. He also introduced several of the methods of sterilisation which are in constant use to-day. His work on lactic fermentation is a classic, and stands as a model of what a scientific research should be.

Like Pasteur, Lister had the supreme faculty of seeing as if by instinct the exact experiment required to eliminate an element of doubt or to advance ahead. He was a master of the experimental method—a rare and precious gift which the Abbate Spallanzani truly said, "has always been confined and always will be confined to the few."

CONCLUSION.

And now I am at the end. No one could come into contact with Lister without being impressed by his noble personality, his magnanimity, his liberality, and his modesty. His aims were of the loftiest kind and probably no medical man ever kept more steadfastly before his gaze the covenants of the Hippocratic oath. He venerated his teachers, he taught his art to his pupils, he kept nothing secret from his profession, and followed that system which, according to his ability and judgment, he deemed best in the interest of his patients. With purity and holiness he passed his life and practised his art.

When one looks down the long vista of time and contemplates the art of medicine three names stand prominent, and we should all feel pride in our English stock which gave birth to Harvey, to Jenner, and to the great Lister—a name to resound for ages.

LISTER AS SURGEON.

BY SIR BERKELEY MOYNIHAN, BART.,
PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

SELDOM is a great discovery the product of one man's mind. In the work of other men it has ancestors, forerunners possessing one or more attributes whose final and felicitous association within new work constitutes new truth. When that new truth is fully disclosed its relation to many other truths familiar to all for perhaps many years and in many associations becomes clear. The claim may then arise that those who have revealed isolated and antecedent truths have priority in the final discovery. Such truths are, however, only progenitors with no claim to be regarded as their own descendant, the new truth itself.

PRE-LISTERIAN SURGERY.

The immortality of Lister, whose centenary we commemorate to-day, is due to discoveries which did for the craft of surgery what John Hunter had done for its science. The oldest human remains bear evidence of surgery. Before Lister came operations had been relatively few, because of their heavy mortality and their almost insupportable burden of terror and of suffering. Every operation risked the life of the patient from one single cause, putrefaction in the wound. So frequent was this that it was always expected; and whenever it appeared no man might foresee or measure its consequences. Evidence of this we find on almost every page of the old text-books and in the biographies of the great surgeons. It is startling to read that when in the year 1821 Astley Cooper operated upon George IV. for a small sebaceous cyst on the head, so tortured was he by anxiety lest erysipelas or pyæmia might develop that he sought to put upon others the responsibility of the operation, on Cline, on Everard Home, on anybody but himself. He speaks of the operation in terms which to us now appear absurd, fearing that "it might by possibility be followed by fatal consequences." He says, "I saw that the operation if it were followed by erysipelas would destroy all my happiness and blast my reputation," and "I felt giddy at the idea of my fate hanging upon such an event," and again, "I am certain that if anything happened to the King that, at any rate, I should leave London and live in retirement." It is hard to believe that a surgeon eminent enough to be chosen for service to the King should be so deeply moved at the prospect of what was to him, as to us, technically the simplest of operations. The exercise of the art of surgery brought terror then where it now brings joy, to surgeon no less than to patient.

STEPS IN THE DISCOVERY.

Lister's discovery was very gradual. His earliest interests in surgical inquiry were concerned with inflammation, its cause, its nature, and possible methods of controlling it. In this, as in many of his earlier investigations, Hunter was both inspiration and guide. His paper on "On the Flow of the Lacteal Fluid in the Mesentery of the Mouse," published in 1857, but based on researches begun in 1853, is an extension of Hunter's experiments on absorption. His studies on coagulation of the blood began with a investigation on the blood in the veins of sheep's "trotters" obtained from the slaughter-house. By devising neat and critical experiment he was able to carry knowledge of coagulation of the blood far beyond the point which Hunter and Hewson had attained a century before. Yet the methods he employed were clearly modifications of those used by his great forerunner. By such investigations as these Lister was training himself, but his chief interest lay always in the problem of the healing of wounds. When, therefore, he learnt of Pasteur's researches his mind was open to the new truths and expectant of them. Before the British Medical Association in Dublin in 1867 he said:—

"In the course of an extended investigation into the nature of inflammation, and the healthy and morbid conditions of the blood in relation to it, I arrived several years ago at the conclusion that the essential cause of suppuration in wounds is decomposition brought about by the atmosphere upon blood or serum retained within them; and, in the case of contused wounds, upon portions of tissue destroyed by the violence of the injury. To prevent the occurrence of suppuration, with all its attendant risks, was an object manifestly desirable, but, till lately apparently unattainable, since it seemed hopeless to exclude the oxygen which was universally regarded as the agent by which putrefaction was effected. But when it had been shown by the researches of Pasteur that the septic properties of the atmosphere depended not on oxygen or any gaseous constituent, but on minute organism suspended in it, which owed their energy to their vitality, it occurred to me that decomposition in the injured part might be avoided without excluding the air by

applying as a dressing some material capable of destroying the life of the floating particles."

Lister's first step was therefore a realisation of the truth that decomposition in wounds depends upon the activity of living micro-organisms; his second, which followed immediately, was based upon the belief that such organisms might be destroyed in the wound, or as they were about to enter the wound; his third and last, which came more slowly, was founded upon the hope that the organisms within the field of operation might be destroyed before they entered the wound.

Around every step of his advance fierce controversy raged. The scepticism and hostility of early contemporaries was stupid, unimaginative, and petty. The history of science is not only the story of new truths and their slow emergence from error, it is a recital of bitter and vexatious opposition from those who should have been the first to acclaim and to welcome the new vision. Only a few weeks ago we learnt once again of the diffidence of Isaac Newton in the publication of discoveries made years before; his reluctance was due in part, perhaps, to a native modesty and indifference to the applause of others; in part also to shrinking of a sensitive nature from the acrimony and coarseness of controversy.

The rank hostility of Riolan to Harvey, the disdainful incredulity of Liebig at the discoveries of Pasteur, are in direct intellectual relation to the revolt of Calvin at the discoveries of Servetus, the animosities of the Church which martyred Giordano Bruno, the threat of torture which subdued the aged Galileo, and all that long record of sinister events which proclaims the inveterate hostility of impervious minds to novelty. For such minds novelty is always error, truth is bent through an angle of refraction as it enters them. Lister's answer to indifference, opposition, and denial was unfaltering continuance in inquiry and experiment, and in the demonstration day by day, and case by case of changed results.

THE HEAVILY INFECTED WOUND.

Few, if any, now living remember the full horror of the old days. But an experience not dissimilar awaited us in the earliest days of the Great War. A pestilence of infection to which we were wholly unaccustomed turned our faces towards the early struggles of Lister. On all sides we heard that our inability to check a raging suppuration in a heavily infected wound proclaimed the failure of Lister's methods. So to Lister we turned again, only to realise much more acutely how the problems which faced us had been his problems, how our experience, horrible in its new revelation, had in the first years of his practice been his daily experience. Reading Lister's works with clearer perception and new understanding of the difficulties by which he was confronted, our admiration of his patience, insight, and courage glowed into greater reverence than ever before. Lip service we had long given to the founder of the new era; we were now compelled to realise that Lister is, indeed, the man who has saved more lives than all the wars of all the ages have thrown away; the man who has changed the face of surgery, the one man who has in truth created if not a new art, at least a new and safe and illimitable opportunities for the practice of the old art.

The first conception in Lister's mind in respect of treatment was that the organisms within the wound, and those entering the wound, might be destroyed by some chemical agent, the nature of which was to be determined by a series of experiments. From time to time changes were made as search brought to light some new chemical substance more active in destroying bacteria and less harmful to the living tissues of man. The search is not ended yet. Up to this moment it has engaged the interest of such men as Dakin, Browning, and J. B. Cohen, and no doubt it will long continue. The problem, however, is not merely that of accomplishing highest bacterial destruction with lowest cellular injury; it is rather one of augmenting the natural powers of cells and of serum to subdue and destroy bacteria and their poisons. Lister, I feel confident, realised all this to a greater degree than many of his successors. Godlee in his life of Lister makes this quite clear. Though the earliest efforts were concerned with the abatement of existing decomposition of wound discharges, it was not long before the problem of the prevention of infection became paramount. It is beyond dispute that Lister clearly realised the distinction between the "prophylactic" and the "therapeutic" uses of chemical agents in surgery. We know now that the old quarrel as to the relative merits of the "antiseptic" and the "aseptic" methods was senseless and jejune; for Lister was indubitably the parent of both; if, indeed, there are really two methods. No surgeon ever practised with success a method in which agents for the destruction of organisms were omitted. Aseptic surgery is the wise practice of antiseptic surgery. There is a difference in detail, not in ideal, or in fundamental truth.

PASTEUR AND LISTER.

We have no need to discuss the relative merits and claims of Pasteur and Lister. It is true that without Pasteur there would have been no Lister at the time when Lister was. Pasteur set out to discover the truth as to spontaneous generation, and by crucial and magisterial experiment settled that problem once for all. While at Lille, in the centre of a district of many distilleries, the problem of fermentation engaged his mind, and the assertion of Liebig, foremost among chemists of his day, that it was "a change in organic fluids and tissues set in motion by the access of oxygen" was shown to be incomplete. The genius of Lister lay in immediate realisation of the fact that the biological truths established by Pasteur might be applied to other circumstances. His mind was prepared for the new vision by his physiological training. I make no attempt to exalt Pasteur by saying that Lister's work was corollary to his; nor to belittle Pasteur by speaking of his ignorance of the full effect of his work. Let the world be thankful for both. We who are within the profession of medicine have once again to learn that progress depends not only upon our own efforts in the discharge of our daily task of healing, but upon an association as intimate as can possibly be with every aspect of biology.

RESULTS, IMMEDIATE AND REMOTE.

The consequences of Lister's work are many and far-reaching. The immediate result was of course the complete abolition of many of the dangers attaching to the most certain and most dreaded peril of all, infection in the wound extending to other parts, causing severe and protracted suffering, even grave risks to life itself. But when the few operations then practised became safe, it was obvious that other operations might be attempted. The result was that procedures condemned as "murderous," the practice of which should, in the opinion of high authority, lay a man open to a charge of manslaughter, were greatly increased in number as soon as it could truthfully be claimed that the risk of operation was definitely less than the risk of inaction. The most exemplary instances were found in the practice of abdominal surgery. Ovariotomy, condemned by highest authority as homicidal (the Governors of King's College Hospital in 1877 had forbidden the staff to undertake it) became so safe in expert hands that neither patients nor surgeon hesitated in the choice of operation.

In all new advances in surgery it is only the patient whose disease has reached a high development threatening disability, suffering, or death, who is submitted to operation; the cases with the greatest risk already attached to them are the first to undergo adventurous treatment. As the safety of surgery is shown in these, similar cases are treated but in an earlier stage, a stage in which the surgical risks are

less, the convalescence quicker, the mortality lower. Ultimately a fatality occurs only in the exceptional case, from causes connected rather with the original disease than with the operation practised. In my days as a resident in hospital ovariotomy was regarded as an operation of utmost gravity, and was performed with much ceremony in private wards and with special nurses. McGill, who led me by the hand along the path of surgery, always had a Turkish bath in the afternoon of the preceding day, and operated at an unusually early hour in the morning. Some mammoth tumours were removed, tumours which at times greatly outweighed what was left of the patient; indeed, we removed patient from tumour rather than tumour from patient. From ovariotomy an advance was made to the treatment of other pelvic conditions. Fibroid tumours of the uterus were eventrated and a constricting band of metal applied to the cervical stump which was brought up into the wound. When for the first time I returned the pedicle to the abdomen after the operation of hysterectomy, our obstetric physician, Dr. Braithwaite, quailed with horror at such temerity. The conquest of other disease of the abdomen was soon inaugurated; the campaign owed almost everything to those who had practised what we now call gynæcology. Spencer Wells removed the enlarged spleen from a patient whose tumour he had believed to be uterine; and a condition of tuberculous ascites miscalled "ovarian cyst" improved so much after the release of the fluid that similar cases were quickly claimed for surgical treatment.

The whole abdomen soon became the province of the surgeon, whose activities also rapidly extended to the cranial and thoracic cavities, so that at the present day neither technical difficulty nor any danger in the trauma inflicted prevents the surgeon from dealing with almost any lesion, wherever it may lie, or whatever its nature. There is scarcely any organ which cannot be attacked; there is no inherent and inescapable risk in any technical procedures.

SURGERY AS AN AVENUE OF RESEARCH.

An extension of safe operative measures within the cavities, especially within the abdomen, has resulted in a complete revision of our knowledge of the earlier structural changes in many organs attacked by disease, and of the clinical manifestations which those changes produce. Surgery has proved an implement of research; it is indeed the most powerful of all, though this fact is not yet fully realised, nor is adequate use yet made of it. In the mortuary period of pathological knowledge only the most advanced stages of disease, those stages which at last proved fatal, could as a rule be examined. The final symptoms of the terminal changes in structure were, not perhaps the only, but they were certainly the chief, interest of the clinician; little was known of the dependence of earlier symptoms upon tissue changes. Pathologists and physicians alike were incredulous as to the truth or significance of much of the new knowledge which the surgeon was daily accumulating as the result of his widening observations. Even to-day the physiologist and physician do not appreciate how much is to be learnt at the bedside or in the operation theatre.

As an implement of research surgery has been generously used by the physiologist in his experiments upon animals. Perhaps the most entrancing exploit of all was that inaugurated in this country by Ferrier and pursued by Macewen, Horsley, Sherrington, and others, by which the functions of the various parts of the nervous system have been elucidated. There is something of enthralling interest in the story of the localisation of function in the cerebral cortex, in the realisation that in the convolutions of the brain exist allotments each with its own highly specialised and exclusive function. The work of the surgeon upon the abdominal viscera, his discoveries concerning not only changes of structure in various disease, but also disorders of visceral reflexes, and symptoms associated with these, have been not less arduous, nor less interesting, and even more fruitful in the clinical study of diseases, and in the relief of human suffering.

The capacity of the surgeon to enlarge the area of his operation has been used with gratifying success in the treatment of accessible cancer. The lines of extension of this disease have been the subject of inquiry by pathological anatomists, who have studied afresh not only the lymphatic systems of the various organs affected, but also the exact lines along which the cancer cells may drift or grow. The work of Sampson Handley on the breast and of Ernest Miles on the rectum are worthy of special commendation. Since we know beyond dispute that cancer is primarily a local disease, we know also that every accessible cancer is curable if operation is practised in the early stages of disease. That is not the least of the debts we owe to Lister. It is his work that has permitted us so to plan our operations that not the growth alone but also all those parts, such as lymphatic glands into which the growth makes haste to extend, can all be removed in one mass, and that infection is now the least of our anxieties.

ACCOMPLISHMENT.

We may almost claim that the full effect of Lister's work is now accomplished. We know that for all time operations of every kind may be practised without the grave risks that formerly were prohibitive. The art of surgery is far in advance of all the sciences upon which its future progress depends. Until they stand abreast, or even advance ahead, the progress of surgery will be slow. The great search for us all must now be for the methods of applying new discoveries in other sciences, physiology, biochemistry, pathology, physics, and the like to the study of disease.

Many lines close in the dial's centre. From all the vast periphery of our surgical world messages of gratitude and of homage converge upon Lister to-day. Lister made possible the new surgery, beyond all question the most beneficent art mankind has ever practised. So long as there are men to live and suffer, so long will Lister be there to heal them, to hold the gates of life ajar.

To the honoured dead we raise our monuments, some cast in bronze, some graven in stone: some like that of immortal Hunter, begun in a man's lifetime, the work of his own hands, are enlarged and lovingly enriched through generation after generation by those who labour in the master's cause. On the roll of honour which in letters of gold bears the names of the saviours of mankind no man is more worthy of remembrance than Lister. His living and enduring memorial is a great, and ever greater multitude of men, women, children of every nation of every race of every creed through his mercy, and by the skill of his most gentle hand, relieved from infirmity and suffering and sorrow, and made for a time triumphant over death itself.

It is immortal Lister we salute to-day, the supreme benefactor of mankind.

LONDON CHILDREN'S HOSPITALS.—The Prince of Wales last week opened a new wing of the Belgrave Hospital for Children, Clapham-road, S.W., of which he is patron. This addition completes the hospital as originally designed, but it is hoped soon to provide a nurses' home and a larger out-patients' department. During the past four years £40,000 has been spent in the building and equipment of two new wings. The institution, which is situated near the Duchy of Cornwall estate, is the only hospital for sick children in South-West London south of the Thames.—At the annual Court of Governors of the East London Hospital for Children, Shadwell, it was stated that the year's deficit of £2000 was largely owing to the obscure position of the institution, "hidden away in the East-End, among high buildings, while bigger hospitals on the main roads have a daily advertisement."—It is hoped to open the Princess Louise Kensington Hospital for Children in September next, and the board of management are about to appoint the honorary medical staff. Upon opening there will be 15 beds; in the near future there will be 30, and eventually the number will be increased to 50. From the beginning there will be a large children's out-patient department, and a similar department for women.

Lumleian Lectures

ON THE

MUSCULAR MECHANISM OF RESPIRATION AND ITS DISORDERS.

The Second Lumleian Lecture delivered before the Royal College of Physicians of London on March 24th

BY SIR CHARLTON BRISCOE, BART., M.D., F.R.C.P. LOND.,

PHYSICIAN TO KING'S COLLEGE HOSPITAL AND TO ST. JOHN AND ST. ELIZABETH HOSPITAL.

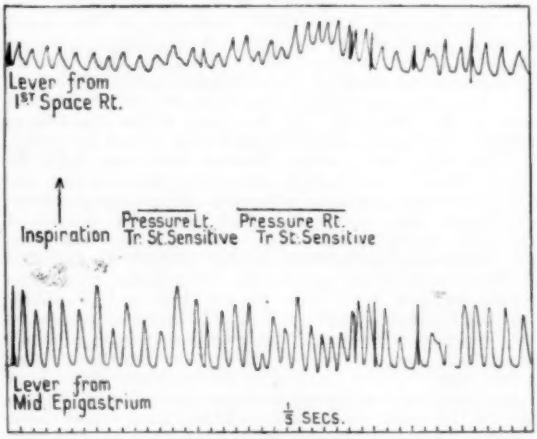
LECTURE II.‡

IN this lecture I propose to deal with certain stimuli which produce an alteration in normal physiological breathing. This alteration mainly occurs in the level or "postural tone" of the different parts of the respiratory mechanism, and is shown by a diminution or by an increase of relaxation at the end of expiration. The stimuli referred to may be transitory or persistent and of long standing, and may be considered to be of the nature of reflexes. Where their action is intermittent the position adopted at the end of expiration will differ accordingly.

PAIN REFLEX.

The first of these to be considered is the response to the sensation of pain experienced anywhere in the body. The accompanying figure illustrates the result of pressure upon a tender muscle. In this instance the

FIG. 1.



Pressure on a tender muscle produces an elevation of the level of the thoracic tracing.

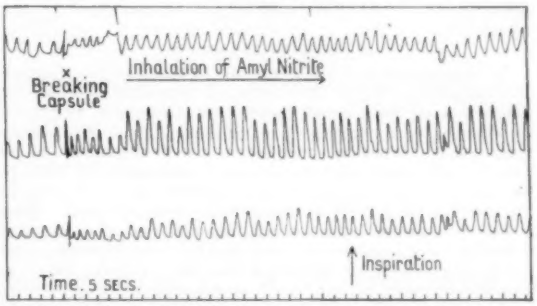
triangularis sterni on the left side was sensitive, that on the right was still more sensitive. The reaction from pressure on either of these muscles was similar, but more marked in the case of the right muscle than of the left. When pressure was made with the little finger on the right muscle between the ensiform appendix and the costal margin there was a certain diminution of the movement of the epigastrium, and associated with it an increased movement and an elevation of the level of the thoracic tracing (Fig. 1). This indicates, therefore, that the relaxation in expiration, which would allow the thorax to resume its normal position, was inhibited—in other words, that a condition of persistent contraction or tone developed in one of the muscles which holds the thorax elevated. Digital examination of these muscles showed that this elevation was due to a persistent contraction, or lack of relaxation in the anterior scalene muscle. This is but an illustration of the general experience of pain producing a prolonged gasp.

‡ Lecture I. appeared on March 26th.

EMOTIONAL REFLEXES.

A similar alteration in mode of breathing occurs as the result of emotions. During these observations one of the bugbears encountered was the diminution in the respiratory movement which almost invariably accompanied prolonged examination of an individual who

FIG. 2.



Mental effect of administration of amyl nitrite. The effect of hearing the capsule broken is to cause a rise in the level of the thoracic tracing. The upper tracing refers to second left intercostal space, the middle tracing to the epigastrium, and the lower to the hypogastrium.

remained in the same posture for a period of half an hour or more. Sometimes this went further and the subject went to sleep.* When this occurred it was constantly observed that the movement of the thorax was greatly diminished, or ceased, while that of the epigastrium was affected similarly, but to a less extent. Occasionally the individual waked up dreaming. In the case of a boy of 16 who was the subject of investigation, a dream of a pleasurable nature occurred.* He dreamed that he was at home in bed. This tracing shows an enhanced movement of the thorax which, at the same time, is accompanied by an elevation of the level of the tracing, again indicating that the posture existing at the end of the expiratory phase was higher than that during sleep, or before going to sleep.

This alteration occurs also very commonly as the result of unpleasant affects. If, for instance, a medical student has agreed to submit himself to the inhalation of amyl nitrite, the same increased thoracic movement and elevation will occur when the glass capsule is broken (Fig. 2). Or, if the investigation consists in the hypodermic injection of adrenalin, when the arm is held before inserting the needle, similar reactions are noted. And again when there is suspicion as to the nature of the investigation elevation of the thorax is observed.*

The group of cases termed "functional," in which may be included the anxiety neurosis, exhibit a prolonged emotional state characterised by a persistent reflex and results in an increased movement of the thorax foreign to the type of chest.* Thoracic breathing is the habit of the functional case. In these cases it is not possible to say positively that elevation has occurred, but it is a reasonable deduction from the maintenance of a continuous increased level, associated with an increased movement such as commonly occurs in the instances mentioned above. It is, of course, impossible in such cases to obtain a tracing of the actual commencement of the condition. It can, however, be observed that there is a persistent tone in the scalene muscles, and that the intercostal muscles of the upper spaces do not relax completely during expiration. This is more noticeable on the left side than on the right.

Darwin [19] showed that in some animals certain emotions caused an extension of the spine, and in my first lecture I showed that such extension of the spine

* The asterisks throughout refer to points demonstrated by means of lantern slides.

is accompanied by an increased movement in inspiration of the thorax at the expense of the diaphragm. Such, however, does not appear to be a full explanation, for in my observations given above there has been, so far as can be told, no alteration of the spine during the period of investigation. The condition would be explained by a diminished relaxation of the scalene, an increased contraction of this muscle accompanied by increased stretch in the upper intercostal muscles.†

In my first lecture I showed a tracing of the effect of increasing the tension on the anterior scalene, which promoted an increased movement of the clavicle and upper ribs.

Conscious Dyspnœa.

It is a common experience that the conscious appreciation of shortness of breath is accompanied by an elevation of the chest, and this elevation must be produced by a similar mechanism. Thus it appears that pain, emotion, transient or prolonged (as in functional cases), and conscious dyspnœa each tend to produce an alteration in the manner of breathing in the nature of a shift towards the thoracic type. This is brought about by a diminished relaxation of certain muscles—e.g., scalenes and upper intercostals—and leads to a raising of the expiratory level of the thorax. The consequent stress on these muscles appears to me to be a factor of great importance in the pathology of the mechanism of respiration.

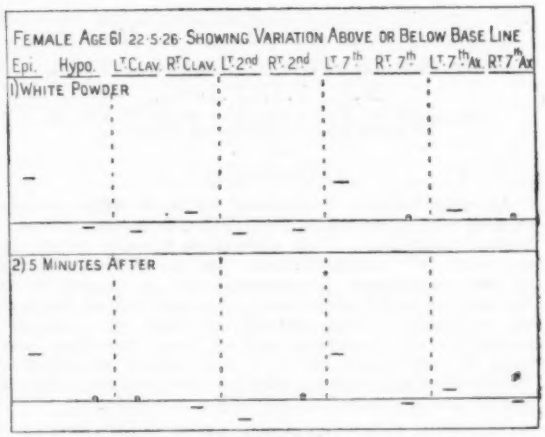
VISCERAL REFLEXES.

Elevation of the thorax, especially affecting the upper part, has been illustrated in the foregoing instances. I propose now to deal with certain special stimuli leading to a diminished postural tone of the diaphragm shown by elevation of the expiratory level, an effect the very opposite of that recorded for the scalenes, an inhibitory action or one of increased relaxation. These stimuli arise from viscera, and though the first example clearly shows an important associated effect on the thorax, with which I have chiefly to deal, the essential change is clearly in the diaphragm.

Gastric Reflex.

In the course of the main investigation I thought it advisable to explore the question of gastric distension, to see whether any light would be thrown on the mechanism of respiration under these circumstances. The first observations were made by taking tracings of the respiratory movements, then sending the individual to get his dinner, following which a second tracing was made. This showed that the epigastric movements were somewhat increased.* It also showed, however, that there was a tendency to diminish the movements of the upper part of the chest, and to increase slightly those of the lower part. In view of these changes it was necessary to make a continuous investigation, for it is difficult, as I have indicated above, to get the subject into precisely the same position on each occasion, and such differences might well have arisen from slight alterations of posture. Accordingly the old method of distending the stomach with a seidlitz powder, in which the two halves were given separately, was adopted, and a continuous tracing was obtained. This showed an elevation of the epigastrium following the rapid distension of the stomach.* It also showed that the thoracic wall on the left side was protruded to a relatively great degree amounting, in some instances, to a total movement of two inches. The record was taken from: (1) the clavicle, indicating elevation of the thorax; (2) one of the upper ribs selected from the second to the fourth; (3) one rib from the lower chest complex, sixth to the eighth rib; and (4) a point taken in the axilla between the eighth and twelfth ribs, these four points being combined to form a single tracing of the left or right side. The right side always moved outwards to a less extent, and sometimes not at all. A further stage in the investigation necessitated the introduction of a series of U tubes containing liquid into the recording apparatus, in order to estimate the alteration occurring

FIG. 3.



Changes occurring after the administration of a seidlitz powder in two separate portions. Short lines indicate the relative elevations or depressions above and below base line.

at each of the four points mentioned, and in the epigastrium and hypogastrium.

By this means certain constant phenomena were found (1) in the elevation of the epigastrium, and (2) the forward movement, eversion, of the lower chest complex on the left side. As regards the movement of the right lower chest complex, this varied; as a rule, very little or no protrusion occurred, but in any case, the movement was considerably less than that of the left side. In the lower axilla the effects varied. In some cases eversion was found to occur, the left side being more affected than the right, in others little or no change was observed, in a few the right side was actually inverted. The hypogastrium sometimes was protruded, but generally remained near the initial level. The effect on the clavicles (as indicating the scalene action) varied, as did also the level of the four upper ribs. In general, there was a depression of both these points, and on both sides, but sometimes in elderly people the clavicles, especially the left, were elevated. The eversion is least marked in normal young adults.* It is more marked in the middle-aged * (Fig. 3), and in the elderly * (Fig. 4) is supplemented to some extent by an elevation of the left side of the chest as a whole. Functional cases show a very marked eversion with elevation of the left chest—a summation effect. The constant alterations shown were: (1) an eversion of the left lower part of the thorax, as indicated by the protrusion of the sixth, seventh, or eighth rib in the nipple line, and (2) the elevation of the epigastrium.

Dr. Livingstone investigated the effect of giving the seidlitz powders to an individual while under X ray observation. He traced the level of the diaphragm on the screen, then gave the seidlitz powder, and four minutes later again made a tracing. Meanwhile the subject was not allowed to alter his position. This was done in ten cases. The results are briefly as follows: There was a rise in the expiratory level of one or other side of the diaphragm in eight cases, a fall in one, and no change in the tenth. This level was on the right side raised in five instances, lowered in one, and unaltered in four. On the left side the expiratory level was raised in seven, lowered in two, and unchanged in one. The degree of inspiratory descent of the same part was on the right increased in three, diminished in two, and unchanged in five. On the left side there was an

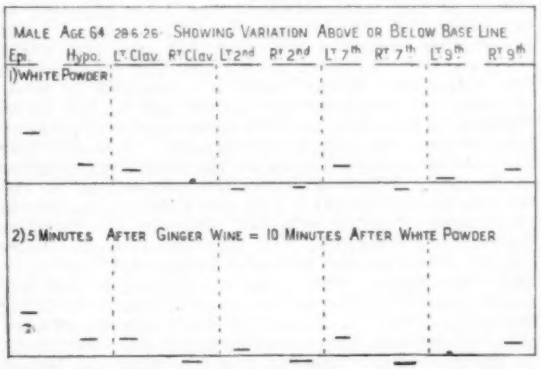
† The level of the left clavicle was observed in a hundred consecutive cases, the individual being in the standard position. The left clavicle was found to be higher than the right in 55 instances. The second rib is similarly affected. This elevation of the clavicle and upper ribs on the left side is due to the lack of relaxation of the anterior scalene muscle and upper intercostal muscles, as compared with the muscles on the right. No doubt this is a phenomenon which accompanies the visit to the consulting room, and is of a temporary nature.

increase of movement in two, a diminution in two, and no change in six. The prevalent changes, therefore, are an elevation of the expiratory level of the diaphragm, more marked on the left side, and no change in the degree of movement. In an antero-posterior view of the chest under X rays a forward movement of the lower rib complex would not be observed.

This reaction has also been tested experimentally by Lady Briscoe* on the cat, the result being that in five cases there has been an elevation of the left side of the diaphragm, and a diminution in its excursion. In the sixth there was a general depression of both sides of the diaphragm, and a period in which considerable irregularity of movement of the two halves occurred. No changes were observed in the chest wall.

From these investigations, it is clear that a rapid distension of the stomach generally produces an effect on the diaphragm in both man and animals; this effect is most marked on the left side, tending to elevation and no increase of contraction. In man this is associated with a certain amount of eversion of the lower ribs with or without elevation of the upper thorax, again more marked on the left side. In the cat the chest wall is not affected. The object of accommodating the full stomach is attained by a different mechanism in man and beast. How long in man this condition persists after the powder I am unable to state. Some of the investigations have been prolonged for as much as half an hour, during which time a gradual diminution occurs in some instances, but is maintained in others. In the cat the condition has been noted as persisting for an hour. It may be contended that this alteration is a mechanical factor and is the direct result of

FIG. 4.

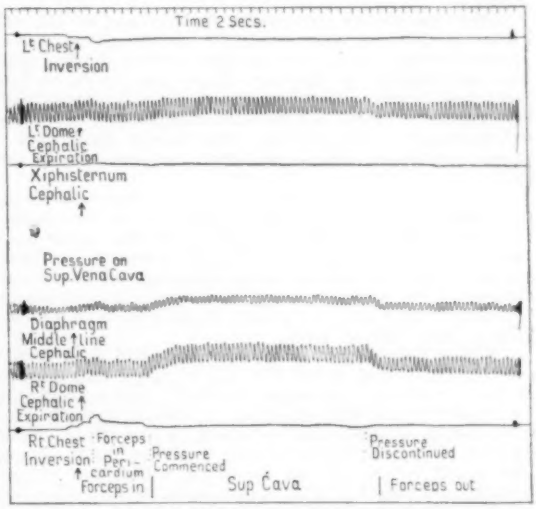


Short lines indicate the relative elevations or depressions above or below base line.

distending the stomach, which thereby pushes up the diaphragm and pushes out the chest wall. As against this objection it may be mentioned that the abdomen was widely opened in the cat experiments, thus negativing the possibility of mechanical influences; and in the human cases, when investigated in the standard position, there was little or no contraction of the abdominal muscles. To clear up this point, it was necessary to discover if other means would produce the same effect, such means not having the disadvantage of increasing, to any considerable extent, the volume of the stomach. The introduction of cold liquids into the stomach frequently produces a sense of discomfort. It was found an ounce of ice cold water in man,* or 10 c.cm. in the case of a cat,* produced the same phenomena, raising the level of the diaphragm in the cat, and everting the lower thorax in man, but to a degree less marked than the seidlitz powder; whereas, three ounces of water at room temperature produced in man only the mildest of changes from which a rapid recovery to the normal took place in the course of a few minutes. The act of swallowing produces similar, but transient, changes in the thorax. Dr. Livingstone could not detect any rise in the level of the diaphragm by X rays with small quantities of ice water.

I believe, therefore, that we are justified in assuming that this change is caused by a reflex arising from the

FIG. 5.



Elevation of level of diaphragm following obstruction to the superior vena cava.

stomach, and owing to its prolonged operation is probably to be classified with the postural reflexes in general.

Cartilages of Thorax.

It remained to investigate the mechanism by which the lower thorax is everted. A study of the thoracic bony cage will clarify the position*; the lower rib complex is formed by the sixth, seventh, and eighth ribs—with sometimes, in addition, the fifth rib—between which the strong cartilaginous baulks are found. In a paper read before the Anatomical Society[20] I described the results of investigating these intercartilaginous joints, and came to the conclusion that their purpose was to assist eversion of the lower ribs. These intercartilaginous joints are present on both right and left sides. The numerical preponderance between the fifth and sixth cartilages on the right side was, I claimed, probably due to the presence of the liver, which was a constant factor preventing the lower ribs inverting to the full. The higher the fulcrum the greater the eversion of the lower thorax. The stomach, on the other hand, on the left side acted intermittently. I concluded, contrary to the usual opinion, that these joints assisted in expansion of the lower thorax, and not in the elevation of the upper ribs. I consider that the action we are now considering is a further proof of that conclusion, though at the time when that paper was written I had not begun this investigation on the stomach, and was not aware of this reaction.

This eversion is a movement, the hinge of which lies somewhere between the upper ribs, which are not protruded, and lower rib complex which is protruded. In trying to elucidate further the mechanism of this eversion of the lower ribs, the muscles of the thorax were investigated before and after a seidlitz powder in 10 cases. Eight of these were chosen at random, and two were out-patients complaining of pain under the heart; the first was a patient in whom the stomach was known to be ptosed, but without marked symptoms, and the other case in which the viscera were transposed. (In the following analyses of these cases this latter one in respect of the right side acts as if it were on the left side, and is

so considered.) The results of this investigation show that age is a prominent factor in the determination of the degree of this change. In the younger individuals muscular change is difficult to detect, and therefore must be slight. When detected it is of the same character as that in the older patients. In this category were four patients below the age of 24, in one of whom only a tonic condition developed in the fifth and sixth intercostal spaces on the left side.

The remaining six were over the age of 40. In four of these a tonic condition developed in one or more of the intercostal muscles of the fourth, fifth, or sixth space on the left side. Among these four are two cases who complained of pain after food ("under the heart"). The remaining two did not show this change, but on the other hand developed a tonic condition of the anterior scalene on the left side.

This result is interesting as confirming and giving a reason for the elevations as shown in the manometer readings of movements of parts of the chest as a result of rapid distension. As stated above, the duration of this action must have a bearing on this point, though I am not able to say how long this contraction persists, but I can state that at all events it persists for at least half an hour.

Where the thorax is already elevated as a result of an emotional state the addition of this gastric reflex produces a summation effect* and accordingly a greater strain falls on those muscles responsible for the sustained posture of eversion or elevation. Thus we see that a stimulus arising in the stomach causes by reflex action (*a*) an elevation relaxation in the respiratory position of the diaphragm, (*b*) an expansion of the chest, particularly of the left side, produced either by eversion of the lower ribs (in the young), or by elevation of the left side of the chest as a whole (in the old), though the actual respiratory movement of the parts is but little affected. The mechanical alteration in the chest is maintained by tonic action in muscles. This reflex I shall refer to later, as I believe it is the cause in many cases of the pain under the heart so frequently encountered.

Heart Reflex.

The question naturally suggests itself, Are there other reflex phenomena in the body which produce a similar change? Dr. J. L. Livingstone and I have been investigating this point in connexion with the heart. We find that in rabbits in which the pericardium can be exposed by removing a part of the sternum, but without producing a pneumothorax so that artificial respiration is not required, manipulation of the heart produces constantly an elevation of the expiratory level of the diaphragm. The experiments have consisted in the temporary obstruction with forceps of the superior* and inferior* venæ cavæ and the systemic and pulmonary aortæ, and also in pressure on the root of the left lung by means of a bent probe. Obstruction to the outflow of blood through the aortæ produces little effect, obstruction to any of the other vessels constantly produces an elevation of the diaphragm and diminished contraction, although obstruction to the main veins of the neck does not have a similar effect. Irritation of the parietal pericardium has no such effect.

I have shown that in cats the reflex produced from the stomach affects the diaphragm only, but in man it produces an effect, not only on the diaphragm, but on the thorax also. It does not seem to be unjustifiable to assume that another reflex producing identical effects in a pronograde animal will in an orthograde man having a highly developed thorax produce a similar and double effect on the diaphragm and thorax, and that as the result of cardiac conditions the thorax in man may be elevated. Such elevation of the diaphragm must be assumed to occur in acute carditis conditions so frequently accompanied by pericarditis, for in them deflation of the lower lobes is frequently found† It is common to find in severe pericarditis an epigastric recession, associated with a marked thoracic type of breathing and persistent tone in the scalenes. The former condition, due to excessive elevation of the thorax and intercostal action, is associated with a defective contraction of the diaphragm. The common factor in the deflation accompanying high paraplegia and unilateral phrenic paralysis, and in postural and postoperative deflation* of the lower lobes is a high diaphragm and thoracic elevation. The prolonged supine posture itself is normally accompanied by an elevation of the diaphragm* and increase of the transverse diameter of the thorax, especially of the lower part, indicating elevation of the thorax. These conditions are accompanied by the varying signs of consolidation. In the early stages crepitations clearing on a deep diaphragmatic breath are commonly to be detected. Such an elevation in cardiac cases in general would account for the crepitations which are heard at the bases of the lung, which are not accompanied by expectoration, and which clear up with forced and voluntary inspiration, and which may equally well be attributed to a condition of deflation of the posterior part of the lower lobes as to one of œdema.

So we see that pain and emotional states, whether temporary or of a more permanent nature, recognised as functional nervous disease, cause an alteration of breathing of the nature of a shift towards the thoracic type with raising of the expiratory level, while reflexes originating in certain viscera, the stomach and heart, result in a diminution of tone in the diaphragm associated with a persistence of tone in the muscles of the thorax. The persistence of tone on the part of the thoracic muscles concerned occurs at the expense of their resting period and must be regarded as an abnormal use or overuse.

Pleurisy.—Tonic contraction of muscles is well illustrated by the conditions which occur in pleurisy, the constant feature of which is the spasmodic condition of the intercostals in the area adjacent to the pleurisy.* In the case of a small area of acute pleurisy the easiest way to find that area over which frictions will be heard is to pass the finger down the intercostal spaces until a complaint is made of pain. At this point the muscle will be felt to be tonically contracted, and if a slight degree of pressure is maintained the pain is accentuated. No matter how the patient changes his posture the muscle still remains contracted. When measures are adopted to fix the rib the muscle relaxes, and the pain disappears in the course of a few minutes, although the frictions become more audible. In this affection the body adopts other means to assist intercostal action to limit movement. The posture assumed in bed will assist, generally lying on the affected side or inclining the spine so that the concavity is towards the affected side. In addition, however, other muscles are employed. In the case of the lower part of the chest, the lateral muscle before alluded to may become tonically contracted, as may also the respiratory part of the transversalis abdominis and the triangularis sterni.* The tonic condition of these three muscles, in the case of pleurisy affecting the lower part of the chest, is easily understood if looked at from the point of view of fixation of the ribs in the neighbourhood of the part affected. There is, still, a further method of securing rest adopted by the body. If a severe case of basal pleurisy is examined in the course of the first 36 hours* it will be found that one of the scalene muscles is in a degree of pronounced tonic contraction. In such a case all the intercostals on that side will be found to be in a condition of tonic contraction (and frequently there will be a general tenderness over the upper part of the chest). There is thus an effort to keep all the ribs on the affected side quiescent, as well as to fix the chest at the upper and lower extremities. This scalene and upper intercostal tonic contraction accounts for the fact so frequently observed that the upper part of the affected chest may appear to be bigger than the normal side; at the same time it is inactive. In the course of a day or so the excessive tonic contraction of the scalenes and intercostal muscles tends to pass

off. This progresses even further, inasmuch as the scalenes and upper intercostals tend to relax, and the contraction in inspiration is less than on the opposite side.* This gives rise to the flattened apex with diminished movement; the tonic condition of the intercostals in the lower part of the chest and of the abdominal muscles persists.

There is still another mechanism which is sometimes adopted in pleurisy, generally in young people, but is more constant in cases of pericarditis. This may be described as a "break" in the intercostal chain. The examination of such a case shows that the scalenes and upper intercostals on the left side are acting normally or are tonic, but that one intercostal, frequently the fourth or fifth, is completely inactive, the muscles of the lower part of the chest being in a general weak tonic condition or acting in expiration.* This relaxation mechanism adopted in the thorax may be carried to a further extreme condition, in which all the muscles acting on one side of the chest become entirely flaccid. I have met with this condition in two case of pneumonia late in the disease, both of which terminated fatally. It is comparable to the lax abdomen in peritonitis and the prognosis is similar. In all these instances the contraction of muscles on the unaffected side goes on naturally.

In pleurisy we have yet another instance in which tonic contraction or lack of relaxation occurs. Observation shows that the tonic muscles are hard and taut, not relaxing and not shortening—i.e., not undergoing a movement contraction—clearly a change which deprives the muscle of its resting period.

Dyspnœa following Pleurisy.

The pain of pleurisy usually does not last for more than a few days, the explanation given being that the irritated nerve-endings of the pleura are covered with fibrin and the mechanical element is removed. The extreme tonic condition of the muscles also diminishes, but in a mild degree persists for a considerable time, frequently for months, and leads to an abnormality of breathing which may produce symptoms. In pleurisy the diaphragm is known to be elevated and its contraction is diminished. Such elevation is of mild degree, and is not comparable to that which occurs with subdiaphragmatic lesions.[21] Applying the suggestion adduced in the former lecture, the explanation is that the intercostal spaces on the affected side are narrowed by muscular action, the ribs are approximated, and therefore the attachments of the diaphragm between the central tendon to the lateral chest wall are also approximated. Stretch is diminished, and so the usual stimulus produces a smaller contraction, or in some instances no response is forthcoming. This is confirmed by animal experiments.* If the condition of approximating the ribs is reproduced the contraction of the diaphragm on the same side is diminished. For reasons which I shall give, under treatment I do not think that there is any evidence of complete inhibition.

Two further points deserve attention; the first is that of the general changes which accompany old age. The second concerns the whole course of life in those who breathe in a manner which is a combination of the two extremes, and these, it should be remembered, constitute the majority of individuals. In old age because the muscles operate in the presence of defective elasticity of lung, the cavity of the thorax becoming permanently enlarged, they work at a disadvantage. Which muscles will be affected depends on the type of breathing adopted, and the greater the tendency to thoracic breathing the greater will be the stress on the muscles expanding the thorax, for in addition to the lung defect the costal cartilages are becoming less pliant. Two means are adopted to overcome this difficulty: (1) permanent elevation of the thorax; (2) increased expiratory muscle effort. The muscles affected will be seen by reference to my first lecture. If, however, respiration is mainly diaphragmatic the difficulty is met by a lowering of the level of the diaphragm, with or without an elevation of the thorax. Thus we find in the senile diaphragmatic type either: (1) bent back and a prominent abdomen, or (2) elevated shoulders and a flat abdomen; and in the thoracic type (3) an over-distended and elevated thorax, the short-necked individual. In either of the last two a strain is thrown on the elevators of the chest. There is, however, a tendency in senescence for the thoracic type to develop a shift towards greater use of the diaphragm (type 1 above), and when this has been achieved, there is disappearance or diminution of symptoms arising from overuse of the muscles operating on the thoracic cage. The activity of these muscles will, however, be renewed with dyspnœa, or under the conditions mentioned earlier in this lecture, or when calcification is taking place. It is interesting to note that calcification sets in early in life in the costal cartilages, when the Wassermann reaction is positive and is, therefore, an early change in syphilis. It may be well marked between 40 and 50 in this disease, whereas calcification in my series of 100 cases examined is not marked before the sixth decade is passed.

Antagonism of Muscles.

The second condition may be termed antagonism. In quiet respiration, diaphragmatic and thoracic breathing are, as a rule, complementary and supplementary, and there is enough margin for comfortable respiration. When either is excessive interference with the efficiency of the other occurs. In excessive diaphragmatic breathing the lower ribs are held down by the lateral muscle approximated by the transversalis abdominis and triangularis sterni. The lower ribs are, therefore, hindered in their thoracic function of being raised and everted. When thoracic respiration is excessive the diaphragm is splayed out, and its contraction is less effective, and becomes still more inefficient when in addition the thorax is elevated.*[22]

A second instance of antagonism occurs when diaphragmatic and thoracic breathing are over-active simultaneously. With the intercostal muscles acting strongly in inspiration to elevate and evert the ribs, the triangularis sterni and transversalis abdominis are approximating the costal margins in the epigastrium, and the lateral muscle is depressing the lower ribs. There is, therefore, an excess of work thrown on to the intercostal muscles, and a strain which is aggravated with loss of elasticity in the ribs.

Analogous to the last described condition is the effect of contraction of the abdominal muscles which function as muscles of posture, especially the rectus abdominis and that part of the external oblique attached to the sixth–ninth ribs. These muscles serve to connect the chest and pelvis, and when in contraction tend to oppose the elevation by the intercostal muscles of the ribs to which they are attached. In both these latter conditions the strain tends to fall on the points of junction between the upper and lower parts of the chest—i.e., in the region of the fifth and sixth ribs.*

To sum up this lecture, certain states of mind, certain somatic and visceral stimuli, senescence and respiratory stress produce changes in the mode of breathing. These changes entail undue activity on the part of certain muscles, which activity I believe to be generally of the nature of enhanced and persistent tonus. This occurs at the expense of the resting period of these muscles. If transient, it may not be of moment, but if persistent it will soon produce exhaustion. Activity in muscles calls for a vast increase in blood flow, and in the case of repeated movement (phasic) contractions this is provided by direct massage to the capillaries and veins. Persistent tonic contraction, so far from helping the circulation, actually impedes, so that exhaustion ensues leading to distress. Distress is appreciated by the patient as pain, and calls for investigation and treatment.

(The bibliography, to which references are given in this lecture, will appear with the third lecture.)

LIGHT TREATMENT IN SURGICAL TUBERCULOSIS.*

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THIS paper is based on experience in sun and artificial light treatment in surgical tuberculosis at the Treloar Cripples' Hospitals at Alton and Hayling Island. The remarks which follow should be taken as restricted to the general light treatment of surgical tuberculosis, and not necessarily as referring to other conditions to which phototherapy might be applied.

It is important to inquire why the results of light treatment in surgical tuberculosis are so variable, why, in some instances so brilliant, and in others so disappointing. If we could explain these differences we should be in a better position to conduct treatment with promise of success. I, therefore, would place before you a theory which attempts to explain these variations. For want of a better term I shall call it the "theory of varying stimuli and varying response." It may, at any rate, form a working hypothesis as a guide to treatment.

Sunlight not a Specific Treatment.

Contrary to what has been stated elsewhere, the sun will not cure all forms of surgical tuberculosis. In my opinion it is in no sense a specific treatment. At the best it is usually merely an aid to, and an accelerator of, cure, and only to a limited degree should it be used as a substitute for other means of treatment. Its employment should supplement not supplant other means of cure. Nevertheless, as an aid it is often of unique value. Treatment by light may be general or local, or both, and the source of light may be solar, from artificial sources, or a combination of both. By the majority general treatment by natural sunlight is considered the best form of light treatment available. I hold the view that the best type of general light treatment to adopt will depend on the nature of response of the individual concerned.

Here let us first briefly consider where sun treatment fails. If, as alleged, the sun will cure all forms of surgical tuberculosis, why is it that it not only will not prevent infection, but also will not cure the disease in subjects living in the most sunny districts? It is well known that tuberculosis will readily infect and rapidly slay unimmunised native races living under apparently the most ideal conditions from a heliotherapeutic standpoint. Islanders residing near the equator, enjoying an equable climate, where the native may live nude all the year round, exposed to and enjoying sunlight of high actinic value, may rapidly die from the disease. It may be argued that the hygienic conditions are bad, and that they have not acquired immunity. But relatively immune resident Europeans becoming infected and who live hygienic lives will not necessarily or even probably be cured under these conditions, so apparently perfect for heliotherapy. They will almost certainly do better if they return home. I am not now alluding to localities such as central or southern India, where the excessive heat renders sun treatment of only very limited application. Were light a specific treatment for tuberculosis, we might reasonably expect that the onset and progress of the disease might be prevented under suitable heliotherapeutic conditions. This is contrary to fact.

Consider the much-lauded Alpine climate. Tuberculosis is endemic in Switzerland. It has even been found desirable to establish a special sanatorium for university students. Tuberculosis will arise and develop in sun-cure stations in the Alps. More than that, it may even progress to a fatal termination in a person resident at such a station who has there acquired the disease and has had heliotherapeutic treatment *ab initio*. Bernhard, though extolling the value of the high mountain sun, quotes Sauerbruch, who draws attention to (what Bernhard calls)—

> "The remarkable observation that swollen tuberculous glands in children who live in the high mountains will not heal up in spite of the sun and direct radiation, but rapidly improve at sea-level or when treated by brine baths in the plains."

Bernhard adds that he will not deny that such cases occur. Such an admission is of extreme significance. Nevertheless, and rightly so, those who employ heliotherapy generally become enthusiastic as to its value.

How may we explain this apparent paradox? I submit that no reasonable explanation has yet been offered by the scientific investigation of demonstrable effects of ultra-violet or other forms of light. Sonne's statement that the value of light treatment is dependent largely on its thermal effect is not adequate. The function of ultra-violet light in raising hæmo-bactericidal power, though of some significance in certain cases, does not furnish the clue. Indeed, in man, hæmo-bactericidal action on specific organisms may at times be so high that it cannot further be appreciably raised, and may even be lowered after exposure. Moreover, this action is obtainable by other means, and is not peculiar to light therapy. Consideration of alterations in the chemistry or composition of the blood and other changes which may follow irradiation of the skin does not very materially help us. Indeed, no known sequel to successful irradiation, either from sunlight or artificial light, affords any completely satisfactory explanation. How then can success or failure, following systematic light treatment in surgical tuberculosis, be reasonably explained? I have already indicated some results of insolation. These, combined or singly, doubtless have a bearing, but they do not tell the whole tale. Let us consider the subject on broader lines and not permit our attention to be diverted by certain known sequelæ to insolation.

Consider a patient receiving suitable insolation in this country. Such treatment naturally implies treatment of the nude body in the open air under conditions which have seasonal, and indeed daily and hourly, variations. The intensity and character of the solar radiation varies with the angle of incidence of the sun's rays, the density of the atmosphere through which they penetrate, the purity of the atmosphere, the presence in the air of moisture, dust, or smoke, the amount of sky shine and of reflected light, the intervention of passing clouds. Moreover, latitude, locality, altitude, climate, temperature, direction and force of wind, proximity of sea, mountains, rivers, or lakes, forests, fields and even the nature of the soil, are all factors not to be neglected.

Factors for Success in Heliotherapy.

At once we see that sun treatment, wherever undertaken, must be administered under continually changing conditions even when applied in one particular district. The intensity and the character of the light available for therapeutic purposes are subject to perpetual change. It is true that the extent of these variations differs much in different localities, but the one common unchanging factor is that of constantly changing conditions. I would go farther, and say that it is perhaps a most important factor. Sun treatment, for its general effects in surgical tuberculosis, is more effective in the constantly changing conditions—not merely solar—found in temperate climates than in the comparatively more stable conditions found in many tropical regions, where the intensity of the light may be much greater and not subject to such diversified actinic variation.

Moreover, there is great diversity of response in the individual being treated. That is true, however, whether he receives sun or artificial light, but in the latter case while individuals may vary, the light applied and the other factors are usually approximately constant.

* Being the opening paper of a discussion before the Section of Electro-therapeutics of the Royal Society of Medicine on Jan. 21st, 1927. Numerous lantern slides were shown in illustration.

The more one considers the alleged superiority of sunlight over artificial light in the treatment of the subject attacked by surgical tuberculosis, the greater becomes the conviction that this superiority is due, not so much to the intensity of the light as to the variations in character and intensity of the light, assisted by changing external conditions not directly due to light. In addition, in the case of a single individual responding satisfactorily to insolation, there is both a seasonal and a daily variation in response. A lengthy clinical experience has taught me that I may reasonably expect the greatest seasonal response in the spring and early summer. This is the period of greatest vegetative activity. Vegetation dormant during the relatively dark winter has enjoyed a period of rest, and now eagerly responds to the light stimulus which it receives. As the summer advances it is unable to respond so vigorously to the stimulus which, though present and perhaps more intense, is less effective. Similarly with the patient. His greatest power of response to the stimulus of light may be anticipated after that period when he has received the minimal stimulation. And in practice we find the greatest progress made is in May and early June, not in July and August when the light intensity may be even greater, and when also the patient is able to tolerate longer exposure. This is not a mere question of skin sensitivity, but of seasonal response.

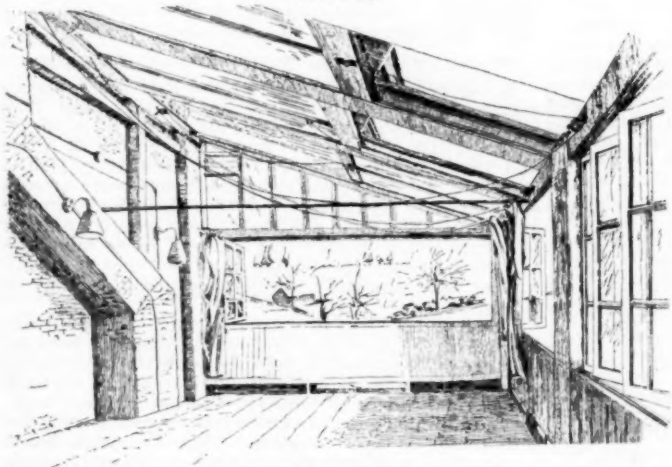
Realising this fact one is able to evoke increased response, if one deems it wise to do so, by changing the character and intensity of light and associated stimuli. Thus, with patients responding well up to July but who are then commencing to flag and whose progress is less rapid, I find acceleration is again obtainable if I transfer such cases from Alton to Hayling. A new type of stimulus produces a notable acceleration of improvement in the patient capable of making the desired response. The basal metabolism is enormously increased by sea-bathing, spraying, paddling, cool sea breezes, and assistance given by the altered character of light. The different intensity of the light will not alone explain the change, the combination of altered stimuli will. Progress again becomes rapid, provided stimulation is not pressed beyond the patient's capacity of response. In other words, given a minimum light value, the benefits of insolation may be ascribed not so much to the intensity of the light as to the shock of varying stimuli (light and other) eliciting favourable responses. The optimum light value will vary with individual patients.

FIG. 1.

Light and shade: Balcony at Alton.

It is unnecessary for me to discuss the harmful effect of prolonged intense stimulation. The patient is unable to make continuous response. In the effort he becomes exhausted, irritable, nervous. There is a practical significance in this observation. Continuous exposure to sunlight in the summer will not produce beneficial results as speedily as alternations of light and shade, of heat and cold, of humid and dry air. Even the onset of a week or so of rainy or cloudy weather may be an advantage to the sun-cure in a hot summer. Alpine writers would have us believe that Alpine sun in Alpine conditions is best of all. I disagree. It is only true for those patients in whom such stimuli will produce the optimum response. Excellent results have been obtained in the Alps, but if these be analysed and compared with results obtained at home, we need not fear the comparison. I am constantly seeing patients who have been wise enough to return from Alpine stations because progress has been arrested, and in whom, in many cases, there are signs of exhaustion and retrogression of the disease. Where the Alpine climate and conditions are really helpful is in the case with much recuperative power capable of responding to intense stimulation. In these, rapid and striking initial progress may be anticipated until power of response becomes exhausted. The dramatic improvement obtained in such cases encourages many totally incapable of such improvement to essay the same cure. I regard it as deplorable that so many patients are sent so far afield who would often do much better by remaining at home. The progress which may be anticipated by treatment in the Alps does not so much depend on the extent, activity, or nature of the

FIG. 2.



End of a sun balcony, showing the sliding roof of vitaglass, folding windows and flap ventilators at floor level.

lesion, or the presence of complicating abscesses or sinuses as on the individual power of response. The cachectic, non-pigmenting patient, of low resistance, even with the most trifling lesion will not do nearly as well under such conditions as if he were to remain at home. The same is true for young children or elderly people, who rapidly become exhausted, and are unable to respond to the excessive stimulation they are called upon to receive. (See Fig. 1.)

Sun Balconies for Use in the English Climate.

In the winter, progress of the individual is often delayed. This is not entirely due to the lack of sunshine available. In part it may be due to a natural slowing down of power of response. Resistance is lowered, Nature, to some extent, resting. At the same time, the English patient is often not subjected to stimuli which have been available during the summer months. These may, however, be supplied partly by natural and partly by artificial means. The following is a practical method which I have employed at the Morland Clinics, Alton. I have there constructed balconies with sliding roofs of vitaglass. This glass is said to transmit ultra-violet light of the wave-lengths found in the solar spectrum. Naturally, some especially of the shorter-waved rays will be absorbed and their intensity diminished. To ensure maximum transmission of light, the glass must be kept clean, a precaution frequently overlooked. By the use of this glass considerable assistance is afforded to helio-therapy in this country when, owing to cold or rain, exposure to the naked sun or to sky shine is impracticable.

As these balconies have proved of great practical help to me I here illustrate one (Fig. 2), as I conceive their general adoption might be of substantial help to other clinicians. That half of the roof adjacent to the wall is permanent and glazed with vitaglass. The distal half consists of sliding panels of vitaglass suitably counterpoised and so constructed that they may readily be drawn up either entirely under the fixed roof or drawn down, or will remain stationary in any intermediate position at will. Thus, if it rains these panels are lowered and patients may still be exposed nude to the sun or sky. The visible and heat rays are transmitted and give ample illumination and usually sufficient warmth. In fine weather the panels are raised and direct insolation proceeds. The walls above the level of the beds are constructed of folding glass panels which may either be completely opened or completely closed, or occupy any intermediate position. Ordinary glass is here all that is needed. Whenever possible both the windows are folded open and the vitaglass panels drawn up. The walls, six inches from the floor, are made of hinged flaps which open outwards so that air but no rain shall be admitted; these, in conjunction with suitable louvres in the roof, ensure perfect ventilation even during driving rain and when it is desirable to have the roof down and the folding windows closed. By means of suitable blinds, shade may be obtained during hot summer days, and when light treatment is intermitted. They also serve the purpose of excluding moonlight. On another balcony, in a specially sunny situation, the fixed portion of the roof is constructed of Calorex, a glass which absorbs the greater part of the heat. On this balcony the patient may be in bright direct sun or pleasant cool shade at will. Artificial light is installed to supplement natural light when the latter is deficient. Thus augmented light treatment with aerotherapy is available under natural conditions at all seasons of the year. The principle of varying stimuli, to which I attach so great importance, is maintained, and the intensity and character of the light treatment may be varied at will. The artificial light employed therapeutically is novel in character, but being still in the experimental stage, its description will be deferred for a later communication.

Diurnal Variations in Individual Response.

While there is a seasonal variation to the response of any given individual to light stimulation, there is also a diurnal variation. It has long been recognised that morning light is most therapeutically valuable. This, in my opinion, is not due solely or even chiefly to the nature of the light; but, because the light-shock evokes a greater response as immediately following the darkness necessarily antecedent; Rollier amongst others has emphasised the value of morning light.

I have indicated that there are seasonal and diurnal variations in response to light stimuli in the same individual. Still more marked are the variations in response to such stimuli in different individuals. I am not here concerned so much with special reactions, such as may be demonstrated in the treatment of rickets by light. Rather am I attempting to visualise the total responses to exposure clinically noticeable in the subject of surgical tuberculosis. These responses not only vary with each individual, but also to some extent with the type of the disease.

If we expose half a dozen different patients to a similar source of radiation, sun or artificial light, or a combination of the two, for a shorter or longer period, the sum total of each of the individual results will be found to vary within wide limits, as evidenced both by the appearance of the patient and the rate of progress towards recovery. Neither is it possible, by altering the time of exposure of these different patients, to attain the same improvement in all, or as will be shown by that patient making the greatest improvement under the optimum exposure. The power of total response varies widely. Scientific heliotherapeutists with physical leanings urge that we should know the intensity of the light we employ in the different regions of the spectrum. Physiologists insist on the significance of the biological reactions to light, but there is no evidence that the sum of the biological responses evoked will be similar in each individual irradiated by identical light under precisely similar conditions. Indeed, all clinical evidence with which I am acquainted in surgical tuberculosis would lead to a contrary view. Viewed clinically, the different responses in different individuals seem almost infinitely variable. That it is desirable to have exact knowledge of the nature of the light employed and of the various effects which it will produce in the organism is undoubted, but I am forced to the conclusion that a correct clinical estimate of the total effect produced is of greater value in treatment than exact information of certain reactions, though I emphasise the desirability of this information where procurable. Heliotherapy in surgical tuberculosis is truly still more an art than an exact science.

The Chief Factor in Raising Basal Metabolism.

It has been repeatedly reiterated that sun-exposure results in increased metabolic activity and this increased metabolism has been attributed to sunlight. Leonard Hill and Argyll-Campbell, working at Alton and Hayling Island, have shown conclusively that a constant rise in the basal metabolism occurs after a course of sun treatment, but that this rise is due to exposure of the nude skin to cold air, not to sunlight. It occurs either in shade or sun and is, as might be expected, greater in winter than summer. Alpine writers attribute this effect to sunlight. That is incorrect.

Basal metabolism is commonly higher in patients treated in the Alps than in lowland districts because they are more exposed to cold, but now the mechanism of its production is understood it may be equally raised independent of locality. Moreover, there is an optimum limit to metabolic activity varying with the individual. I am convinced that the high basal metabolism produced by exposure to excessive cold as described by Leonard Hill in some shivering Alpine children is not only not beneficial but actually harmful. To maintain it is both cruel and undesirable. A raised basal metabolism controlled within proper limits suited to individual requirements is advantageous. It means the exhibition of energy production. Heat is generated internally and lost from the body. This necessitates the ingestion, digestion, and absorp-

tion of more food. It implies increased oxygenation, tissue change, and elimination of waste products. Associated with this is a speeding-up of repair in damaged tissues. But there is a limit beyond which this additional strain on the patient should not be attempted. The very young or old, the weak and cachectic, cannot successfully undertake such extra work. For these such rigorous treatment, inseparable from the winter cold even when associated with sunlight, is contraindicated. Especially is the strain harmful if protracted. If such a reaction is desired, it is better obtained as a series of progressively increasing shock stimuli than by continuous exposure, and in no way are these stimuli better obtained in suitable subjects than by graduated paddling, spraying, or immersion in sea-water. In those who are able to respond suitably the glow of reaction after a sea-bathe, the tingling of the skin, the sense of exhilaration and well-being, the increased appetite and power of assimilation of food, and the associated appearance of robust health, are evidences of the benefits of this stimulus. While the average basal metabolism of our resting, nude, recumbent patients at Alton is 40 per cent. above the normal, during a sea-bathe at Hayling it may be raised to 1000 per cent. above normal, and its value is reflected in the improvement observed in patients suitable for such treatment. The food cost per head of patients at Hayling receiving such treatment is nearly double that of similar patients at Alton. They need, consume, and utilise more food to do the necessary extra work they are called upon to perform, and the value of such work is reflected in the more rapid repair of healing lesions. But such additional work should be only demanded from patients capable of usefully making such effort, and we therefore only select such patients for this treatment as may be expected to respond suitably to the stimulus. The very young or old, the very weak or toxic and cachectic, in fact, the very ones whom we especially desire to aid are those incapable of responding to the strain such treatment necessitates. For these, the high Alps and the seaside are contraindicated. Much as we desire them to progress, we must of necessity be patient and content with the more gentle stimulus obtained inland.

It is noteworthy that though the incidence of tuberculosis is diminishing, tuberculosis in this cachectic type has been, during the last few years, increasingly evident in my experience. I attribute this to children born during the war who, owing to dietetic and other reasons during the pregnancy of their mothers, and during their own infancy are endowed with lower resistance to disease than the ordinary child. They have been more readily infected and possess less power to resist implanted tuberculosis. This type of patient is, as one would naturally expect, more common as you descend the social scale. In establishing our marine branch hospital at Hayling Island I had been largely influenced by the hope of especially aiding this type. In practice I have found that exactly the contrary meets their case. Gentle stimuli are all they, at first at any rate, can suitably respond to. Without, as far as I am aware, having appreciated these reasons for doing so, Reyn has endeavoured to provide the bathing stimulus in the artificial light treatment administered at the Finsen Institute, and after the general light bath invariably submits his patients to a cold or tepid douche. I do the same.

To return to light treatment proper, permit me to illustrate my thesis by perhaps an extreme example, none the less valuable because recorded by an astute lay observer. The Comte de Tressan thus describes a visit he paid to the celebrated author of "Gil Blas" who was then aged upwards of 80 years:—

> "I had been apprised not to visit M. le Sage till near the approach of noon, and the feelings of that old man showed me the effect which the state of the atmosphere produced in the melancholy days of bodily decline. M. le Sage awakened every morning so soon as the sun appeared some degrees above the horizon, became animated, acquired feeling and force in proportion as that planet approached the meridian; but as the sun began to decline, the sensibility of the old man, the light of his intellect, and the activity of his bodily organs began to diminish in proportion, and no sooner had the sun descended some degrees under the horizon than he sank into a lethargy from which it was difficult to rouse him." (M. le Sage died in the winter of 1746-47.)

In such a case a feeble light stimulus was sufficient to produce an optimum response. Had M. le Sage been suddenly exposed nude to the Alpine sun, under Alpine conditions, the shock would probably have been fatal, while to a lusty young infected adult with good resistance it would be the best possible stimulus to apply.

I have said enough to show that at this stage of our knowledge, exposures to light should be gauged by the estimated power of responses as judged by clinical experience. It may be said that this is empirical and unscientific, but I maintain it is correct. It is pursuing a false ideal to attempt to estimate individual requirements by mere physical measurements of light intensity or the observation of isolated physiological effects. I have seen both elderly and very ill people harmed irreparably by light treatment given by rule of thumb in doses applicable to healthy adults, but totally unsuited and much in excess of their especial needs. Clinical observation and experience are our best guides in the art of heliotherapy at this stage of our knowledge.

Pigmentation.

I should here make brief reference to the rôle of pigmentation of the skin following sun treatment. Its value has been denied, but shrewd clinical observers like Rollier testify to its utility. With them I agree. It is valuable because it has a protective function. Longer exposure to light and cold can be tolerated and, if such exposure is correctly timed, is advantageous. Pigmentation is not necessarily synchronous with amelioration of disease, though it frequently is so. A pigmented patient may be so severely infected that nothing will save him, but that is not the fault of his pigment. Moreover, when a patient is well pigmented, erythema, one of our useful aids to dosage, is lost and an unskilled practitioner may make errors in exposure, but that is the fault of the physician. As a general rule, a well-pigmented subject can tolerate and benefit by longer exposures to light and cold air than a non-pigmenter, and the danger of error is diminished.

There are some good pigmenters who do not respond successfully to insolation in spite of every care in its administration. In those it is well to review our other methods of treatment and satisfy ourselves that nothing is amiss. In such patients light treatment should probably be more intermittent and the effect of increasingly strong shock exposures ascertained. Quite likely much stronger or weaker stimuli than have been given are needed. If these investigations are made carefully, the number of good pigmenters not responding properly will be found to be reduced when errors in one or other method of treatment are eliminated.

From a consideration of the above it may be inferred that general artificial light treatment for surgical tuberculosis owes much of its lack of success to the non-recognition of fundamental essentials. Constant intensity of light with regular exposures under the stable conditions found in a light department cannot be expected to produce optimum benefits. A certain minimum of light varying with the individual may be considered as essential for the conduct of light treatment, but after that, greater importance is attached to varying intensities and times of exposures, in this way, simulating more nearly light therapy under natural conditions.

Local light treatment of superficial lesions is governed by entirely different rules of application. It is administered to produce a direct reaction to a definite stimulus. As an example, lupus vulgaris may be instanced where local light is of value by its direct bactericidal action, its thermal effect, and the

local favourable inflammatory response which suitable exposure elicits.

In conclusion, it may be urged that the value of general light treatment in any particular district depends only partially on the intensity and nature of the sunlight available. For some individuals very intense light is the reverse of beneficial, particularly in feeble cachectic patients with little power of response. What is of greater importance is the application of varying light and other stimuli, graded and varied according to individual needs. Patients able to respond well will do well under intense stimulation, whereas for weaker, cachectic, and elderly patients great caution should be exercised and only slight stimulation is at first appropriate.

If the inferences I have arrived at from a study of sun treatment are correct, it would appear that the search now being made for a suitable therapeutic artificial light of constant character and intensity, readily measurable by physical means or by individual biological responses, and constant in application, is illogical, and clinical evidence supports this view. Rather should we adopt the method of varying stimuli graded to produce optimum responses in individuals who are themselves susceptible to infinite change in reacting power. It is on these lines I am now directing experimental work.

To one other response I should like to make passing mention. All observers have been struck by the valuable psychological action of light as evidenced by the cheerfulness and vivacity of the suitably insolated subject. Light is a tonic both to the mind and to the body, and its effect in stimulating mental activity is one of the most interesting and not the least valuable phenomena associated with the complex and fascinating sequelæ following light therapy in surgical tuberculosis.

GLYCOSURIA COMPLICATED BY GALL-STONES.

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THE following case presents much that is of interest both from the theoretical and practical point of view, and is therefore thought to be worthy of publication.

T. J. D., a storekeeper, aged 56, was admitted to Ruthin Castle in March, 1926, complaining of fatigue, the passage of large quantities of urine and glycosuria—the latter was first discovered eight years previously and had been present constantly ever since despite dietetic measures. Six years ago he had an attack of acute abdominal pain diagnosed as gall-stone colic, there was a further attack two years ago, and one mild one since.

On examination the patient, who was a flabby, obese subject, presented no physical signs of disease beyond a sluggish reflex in the right upper quadrant of the abdomen and slight tenderness over the gall-bladder. Radiological examination of the gall-bladder region showed that this organ had a uniformly dense fundus with several opacities in the region of its neck.

The usual routine employed at Ruthin Castle in the management of a diabetic patient was followed in this case. For 48 hours he was kept on a diet similar to that which he had been taking before admission—viz., C. 40, P. 106, F. 142 (calories 1920). The blood-sugar was estimated night and morning at 6 P.M. and at 8.15 A.M., the urine collected for 24 hours and the quantity of sugar estimated. Although the blood-sugar on this diet remained relatively low—0·14 per cent.—the urine-sugar amounted to over 15 g. in each collection. Patient was therefore fasted for 24 hours, but, despite the fact that the blood-sugar fell to 0·09 per cent., the urine did not become sugar-free. A "ladder" diet was then instituted, the carbohydrate being kept very low, and, as he was so much overweight for his age and height—namely, 2 st. 9 lb.—the diet was not raised above one of 1110 calories, C. 8, P. 80, F. 81. On this diet, combined with massage and Vichy massage on alternate days, the patient steadily lost weight, but the urine failed to become sugar-free—from 2 to 7 g. being lost daily in the 24 hours' collection. The use of insulin was contra-indicated as the blood-sugar was now keeping at a normal level averaging about 0·12 per cent.

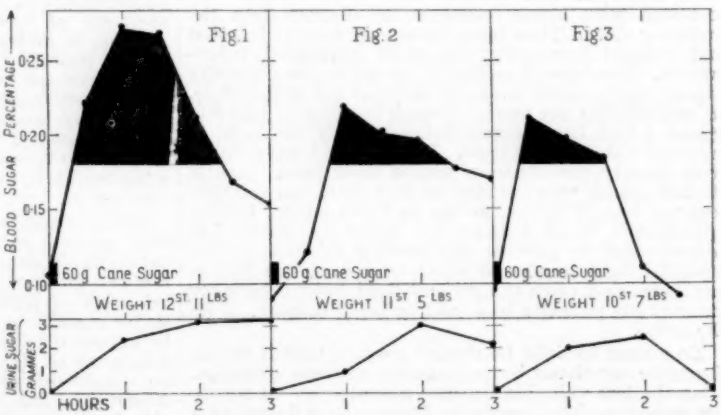
A carbohydrate tolerance test done about this time (Fig. 1) gave a typical diabetic type of curve, and an iodeikon test confirmed that the opacities in the gall-bladder region were actually in the gall-bladder.

It seemed probable, therefore, that the patient was an atypical case of diabetes mellitus—atypical in that with a normal blood-sugar there was a constant loss of sugar in the urine. Renal glycosuria was ruled out by the carbohydrate tolerance test (Fig. 1) which showed a true defect in dealing with excess of carbohydrate. The association of chronic pancreatitis with infective conditions of the gall-bladder and its ducts has long been established; it seemed probable, therefore, that the gall-bladder disease was the cause of, or at any rate was aggravating, the diabetic condition, and for this reason operation was advised.

Preparation of Patient.—For several days before the operation patient was kept on a diet liberal in carbohydrates but restricted in fats (C. 70, P. 40, F. 50, calories 920), in order to lessen the danger of acidosis from incomplete oxidation of the fats.

Operation.—This was performed under gas, oxygen, and ether anæsthesia by Sir Berkeley Moynihan. The liver was small and tucked away beneath the right costal margin, the gall-bladder was shrunken, a large stone was palpated at the fundus, and several small ones in its neck. The pancreas felt hard and indurated. Cholecystectomy was performed. Patient stood the operation—which was technically a difficult one—well, and at no period of the operation gave cause for anxiety. The gall-bladder, which was small, had a thick fibrous wall and contained a large stone of putty-like consistence at the fundus with three smaller stones of a similar nature in its neck. A culture taken from the interior of the gall-bladder directly after operation gave no growth on blood-agar or on a MacConkey plate, and a culture from the interior of the large stone gave no growth in broth. The blood-sugar before operation was 0·12 per cent., immediately after it had risen to 0·24 per cent. Six units of insulin were therefore injected, and thereafter blood-sugar estimations were made hourly—after five hours the blood-sugar had again fallen to 0·12 per cent.

Post-operative Treatment.—The first 24 hours after operation patient was kept on rectal salines every four hours—each injection being of 10 oz. and containing 10 per cent. glucose with 1 drachm of bicarbonate of soda; in addition alkaline water was given as required by the mouth. Blood-sugar figures on this day were 0·15 per cent. and 0·21 per cent., urine-sugar 27·1 g., and acid bodies 4·3 g., 14 units of insulin were given in two doses of 6 and 8 units respectively. On the second day 6 oz. liquid feeds were given two-hourly, these were chosen from water, lemonade, milk, milk and water, and weak China tea. Each feed contained 5 g. of sugar so that a total of 60 g. of sugar was taken in the 24 hours, in addition alkaline water was given as required, a total of 240 gr. of bicarbonate of soda being taken in the 24 hours. On this day blood-sugar figures were 0·16 per



cent., 0·19 per cent., urine-sugar 22 g., and acid bodies 1·5 g. Insulin was given in two doses of 6 units each.

During the following 15 days patient was kept on a diet relatively high in carbohydrate value but restricted in fats—viz., C. 45, P. 45, F. 40, calories 740. Twelve units of insulin were injected daily in two doses of 6 units; the blood-sugar varied during this period between 0·13 per cent. and 0·18 per cent., and the urine-sugar between 2 and 5 g. Acid bodies, which on the day of operation amounted to 5 g., dropped to unestimable quantities on the fifth day, to traces only on the tenth day, and finally disappeared on the fourteenth day after operation. Two days after the last trace of acid bodies had disappeared from the urine, the carbohydrate in the diet was dropped from 45 to 10 g., and, for the first time for eight years, sugar disappeared from the urine. Patient was then fasted, insulin omitted, and a "ladder" diet again instituted. The carbohydrate intake was raised to 30 g. without any return of glycosuria, but the fats were not pushed beyond 80 g. as he was still somewhat overweight. A carbohydrate tolerance test done at this time (seven weeks after operation) showed a considerable improvement in the form of the curve (Fig. 2).

The patient was discharged on a diet of C. 36, P. 65, F. 83, calories 1195, blood-sugar figures on this diet varied between 0·10 and 0·12 per cent., and the urine kept sugar-free without having further recourse to insulin.

Discussion.

In the majority of cases of diabetes mellitus the renal threshold for sugar becomes raised; this case is unusual in that a true defect in carbohydrate storage has been associated with a very low renal threshold. In addition the case was complicated by a diseased gall-bladder and a marked degree of overweight. According to Joslin and other authorities it is becoming increasingly evident that gall-bladder disease bears a distinct relationship to the essential pathology of diabetes, it seemed rational, therefore, to advise operation in this case. The methods adopted to combat acidosis by giving a diet liberal in carbohydrates but restricted in fats before the operation, with plenty of fluid, sugar, and insulin with blood-sugar control for several days after operation have been described—the successful issue has been mentioned.

Eight months later this patient was free from all symptoms of the disease, his fatigue had gone, the urine had remained sugar-free, and he felt strong and well. On a diet of C. 40, P. 65, F. 85, calories 1220, the blood-sugar figures varied between 0·10 per cent. and 0·13 per cent., the urine was sugar-free, and a carbohydrate tolerance test gave—for his age—a normal type of curve (Fig. 3). His weight had dropped to 10 st. 7 lb.—i.e., about normal for his height and age. Although the loss of the 2 st. 4 lb. of overweight must materially have benefited his general metabolism, yet it seems probable that it was the removal of the diseased gall-bladder which was the deciding factor in alleviating the diabetic condition.

Clinical and Laboratory Notes.

TWO CASES OF ABDOMINAL ABSCESS
ILLUSTRATING THE VALUE OF ANTISEPTICS.

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THE following cases are recorded as a small tribute to the work of Lord Lister:—

CASE 1.—A girl, aged 19, was admitted to hospital suffering from appendicitis which had commenced acutely ten days before. The pulse-rate was 110 and the temperature 102° F.

Operation was performed immediately after admission. The skin was disinfected with warm formalin lotion (1 in 300) followed by alcohol sublimate solution (1 in 1000). When the abdomen was opened a large iliac pelvic abscess with an almost intolerable stench, had to be evacuated. The appendix—which was disorganised and enshrouded in a peritoneal fossa—was clipped off after application of catgut ligature to its base. The huge cavity was then mopped as dry as possible and stuffed with large rolls of gauze wrung out in fresh iodoform emulsion. The upper segment of the "vertical" wound was closed by three interrupted through-and-through double silkworm-gut sutures. Two similar sutures were introduced into the lower portion, their ends were knotted together, and they were left alongside gauze rolls as waiting sutures.

The gauze soaked in stinking pus was removed on the second morning, and low level "peroxide carbolic" irrigation was done three times a day with "perchloride" fomentation dressing. By the seventh day there was no further smell or discharge of pus, although in the depth of the wound a necrotic-looking cæcal wall was still in view. On the eleventh day the wound had no pus in it and had bright red granulations around the parietal opening; the gut was still of a dirty white colour but was dry. The closed segment had united by first intention, and the three silkworm-gut sutures were absolutely clean, without even a drop of serum or sign of irritation around the stitch holes. The two waiting sutures were in a similar state.

On the twenty-first day, the wound having granulated sufficiently (without intestinal perforation), the sister partially closed the open crater with the two waiting sutures which had preserved their aseptic condition. The three upper sutures had been removed on the sixteenth day.

From the seventh day the five silkworm-gut (double) sutures had remained innocuous in an apparently normal white skin which had previously been swamped in mephitic pus, but which, for 20 days afterwards, had been frequently saturated with warm peroxide solution (1 in 17) and carbolic (1 in 70), and dressed with lint wrung out in hot corrosive sublimate solution (1 in 3000).

CASE 2.—At the same time there was in hospital another case giving striking proof of the value of antiseptics. A young man was operated on for subacute appendicitis, and a small abscess was found presenting on the under surface of liver. The lower segment of the parietal wound was closed by interrupted through-and-through silkworm-gut; the hepatic cavity, having been cleaned out, was first week drained by large rubber tubes. At operation two silkworm-gut waiting sutures had been introduced in upper segment.

On the eighth morning, as a drainage tunnel appeared well-established, the tubes were omitted, and treatment with peroxide carbolic and with sublimate fomentations was begun. On the tenth day the purulent discharge had ceased; on the fourteenth the three lower sutures were removed from an apparently united aseptic wound. The hepatic segment was gradually closing with bright red granulations, but the wound was not as yet suitable (too oval) for closure by waiting sutures. On the thirty-second day after operation the silkworm-gut sutures were still in perfectly aseptic condition, and after so long an exposure were still placidly waiting to be tied.

A CASE OF
IODISM IN WHICH ŒDEMA GLOTTIDIS NECESSITATED TRACHEOTOMY.

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ASPHYXIA from potassium iodide poisoning seems sufficiently rare to warrant the publication of a case.

M. R., a stout and lethargic widow aged 62, had suffered intermittently from varicose ulcers of both legs since 1913, and was admitted to St. Marylebone Hospital on August 28th, 1926. Her Wassermann reaction was negative. She had marked pyorrhœa alveolaris and was subject, in winter, to exacerbations of chronic bronchitis; but she was otherwise a healthy woman. On Sept. 14th potassium iodide was exhibited.

That night, after 15 gr. of the drug had been taken, she complained of discomfort and was examined upon the night round. She had swelling of both submaxillary glands, more marked on the right side. Next morning (Sept. 15th), after a total of 25 gr. potassium iodide, she complained of a "cold." The submaxillary swellings were larger, the conjunctivæ suffused, and the pharyngeal mucous membrane was œdematous. The iodide was stopped (N. W. S.) and a tentative diagnosis of idiosyncrasy to iodides was made.

At 4.30 P.M. she was reported by the nurse in charge as "very dyspnœic with some obstruction to respiration." On examination (L. H. S.) the throat was found to be more swollen, and a laryngoscopy showed œdema glottidis. Breathing temporarily improved; but tracheotomy instruments were prepared, the position of the cricoid was marked, and 16,000 units of diphtheritic antitoxin were injected subcutaneously, the possibility of laryngeal diphtheria being in mind. In fact, however, the swab then sent for examination was negative.

At 8 P.M. on the same day severe dyspnœa recurred and a rapid tracheotomy had to be performed (L. H. S.) with the patient in extremis and unconscious. By this time the neck was so swollen that an ordinary silver tracheotomy tube was not long enough, and the wound had to be held open by the thumbs while the patient recovered breathing. Eventually a longer rubber tracheotomy tube was inserted.

In three days all the swelling had subsided. The tracheotomy wound rapidly healed and the patient was discharged a fit woman on Sept. 22nd, the ulcerated legs also having healed. We now feel a certain trepidation when prescribing potassium iodide.

A classical description of similar symptoms was that of H. Huchard and P. le Gendre[1] in their paper, "Crise laryngée (Œdème arytenoidien avec spasme glottique) provoquée chez un tabetique par l'emploi de l'iodure de potassium et ayant nécessité la trachéotomie."

We wish to thank Mr. Basil Hood, our medical superintendent, for permission to publish this case.

Medical Societies.

BRITISH MEDICAL ASSOCIATION CONFERENCE.

A CONFERENCE was held in the Council Room of the British Medical Association House on Monday, April 4th, to discuss

RESEARCH AND ANIMAL EXPERIMENTATION.

Mr. R. G. HOGARTH, President of the Association, took the chair and the following motions were discussed by representatives of medical and scientific bodies present:—

(1) That this Conference, believing that any withdrawal or curtailment of the powers at present granted under license and inspection, will hinder medical research to the detriment of the health and well-being of the community, wishes to enter a strong protest against any Bill which has for its object further restrictions upon experimental work on dogs or other animals.

(2) That this Conference is of opinion that the existing law should be altered so as to permit, under proper provision for the prevention of pain and for efficient inspection and control, the use, for purposes of research, of some of the numerous stray and unowned dogs now taken up by the police and condemned to the lethal chamber, thus ensuring conditions which are essential to progress in physiological knowledge and to the application of this knowledge to the practice of medicine.

(3) That copies of the above resolutions should be sent to the Prime Minister and to the Home Secretary, together with a note of the names of those present at the Conference and of the bodies they severally represent.

The CHAIRMAN opened the proceedings by reminding the delegates that the agitation which they had met together to combat was not new, but was kept alive year by year by bequests to various societies for the special protection of dogs. It was not distinguished by any scrupulous accuracy, and he doubted whether five per cent. of those who conducted its emotional propaganda were aware of the rigid restrictions under which animal experimentation was carried on, or of the beneficial results which had accrued from it. He did not challenge their sympathy for the sufferings of animals, but their inability to appreciate the deeper issues involved. The overwhelming weight of scientific opinion laid stress on the unique experimental value of the dog because of the similarity of its physiological processes to those of man. He asked the meeting to say in effect to Parliament: "Trust our scientists, and trust them fully." Less harm would come to dogs from them than from the short-sighted advocates of the Bill.

The Threat to Research in General.

Lord DAWSON remarked that although the current agitation was ostensibly directed towards excluding dogs from experimentation, the principle of experiment as a whole was involved. For his part he was delighted; it was much better to face the question outright than to allow their opponents to attack it in detail. If it were wrong to use dogs it was wrong to use other animals. It was unlikely that doctors who were trained to care for human suffering would be drawn into cruel and inconsiderate methods. It could therefore be assumed that there was no cruelty of intention. The fundamental point at issue was whether men were ethically justified in using animals for any of their own purposes; no one could pretend that the preparation of the turkey for the anti-vivisectionists' Christmas table was a pleasant process, or that horses really liked drawing heavy loads, or that cattle enjoyed being castrated. Surely the answer was that special use of animals was justified provided that the end in view was sufficiently beneficial to mankind and that the animal suffered no undue discomfort. It was often forgotten that animals had none of the terrors of anticipation and other mental agitations that often far outweighed human physical suffering. The medical profession, with full sense of responsibility, assured the public that without experimentation it could not carry on. If the public said that experimentation was not justified, well and good; he would like to see the question brought to a head. If they took that responsibility, all the implications that followed were theirs. He was satisfied that once the public understood what those implications were, it would not be long before they withdrew their support from the opponents of experimentation. Was the public willing to take the responsibility of saying that the use of insulin was not justifiable; if so, the medical profession would like it stated in plain language. It must be understood that the work of research into the causes and treatment of such conditions as jaundice, gall-stones, typhoid, and lock-jaw, and into the action of such drugs as pituitary extract must cease if such a Bill became law. Were the actions of new drugs to be tested on the wives and daughters of the public, he asked, or were no new drugs whatever to be used? A dog was never used without good reason, but whether a dog was necessary or not could be settled by nobody but the experts concerned. The profesison appealed confidently to the public on the question as a whole, not on this mere subterfuge, and asked that their colleagues in research should be left undisturbed by this mischievous and harrassing interference.

Dogs and the Surgeon.

Sir HOLBURT WARING related his experiences in research work and in the use of animals, as an alternative to patients, for acquiring surgical technique. From a technical point of view a large dog was far and away the best. If the public desired that progress should be made by surgeons, animals must be used, and in his opinion the amount of suffering thus entailed was much less than in experimenting upon patients. He considered that surgeons, as a body, had a right to be allowed to try to make advances in their own sphere. He had had personal experience of the effectiveness with which the legal restrictions on experimentation were enforced.

Dr. G. M. ROBERTSON spoke of the amount of suffering, of mind as well as body, that had been saved to the human race by the sacrifice, small in proportion, of a few dogs. He quoted illustrative expressions of opinion from those people who, contrary to most normal men and women, regarded a dog as of greater value than a human being, and asked if legislation on so important a subject was to conform to the ideas of such people. To those who knew the facts it was

[1] Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, 1885.

inconceivable that anyone could approve of the Bill, which was based on a failure of imagination. He then spoke of the importance of experimentation on dogs and cats to cerebral pathology, and quoted from O. Henry: "I am a Kentuckian and I have seen a great deal of both men and animals, and I never yet saw a man who was over-fond of horses and dogs but what was cruel to women." The public entrusted their lives to the profession, and it did not seem too much to expect that they would not cause unnecessary suffering to another of God's creatures.

Mischievous Methods of Attack.

Sir THOMAS LEWIS said that the science and practice of medicine had been built upon the examination of living people, the dissection of dead bodies, and experiments on living animals, and all our knowledge of human disease was derived from these sources. Had any one of them been closed, medicine would have failed to emerge from the Dark Ages. He suggested that any one of his hearers should sit down and write a reasoned statement on the process and control of the circulation, or of the nervous system, without using any fact or inference derived from experiments on living animals. Only then would he fully understand the fundamental part these experiments had played. He illustrated this point from the cardiovascular system. The supporters of the Bill displayed astonishing ignorance of the conditions under which animal experimentation was carried on. No dog could be kept in serious pain without the fact becoming immediately known, and there was no licensed building in the land in which such conduct would be tolerated. The recent petition of the National Canine Defence League proved by its inaccurate statements that its signatories were the victims of a mischievous campaign and unfitted to influence the decisions of Parliament. The leaders of the antivivisectionists in this country were unscrupulous or culpably negligent in presenting grossly inaccurate evidence and in perverting the meaning of plain words. The campaign satisfied a morbid craving for the horrible and gruesome and the "tortures" of animals which brought to many right-minded people much needless suffering existed only in the imagination. Those engaged in attacking animal experiment were engaged in an attack on the progress of medicine; those who lent their support were upholding a campaign against the cure and alleviation of human suffering.

Lieut.-Colonel J. W. BRITTLEBANK said that as a veterinarian he saw a good deal of the societies responsible for this emotional propaganda, and were it merely emotional, and not unprincipled, would not object to it, but actually there were no lengths to which these propagandists would not go. He thought there could be no other civilised land where men who devoted themselves to the mitigation of suffering in man and animals were so pilloried as in this country. He was there to offer the utmost support of the veterinary surgeons. He emphasised the difference between the mental attitude of man and animals, and referred to the research on distemper, asking whether that was to be stopped.

The General Practitioner.

Dr. H. B. BRACKENBURY said that an accusation of cruelty or callousness, or even of a lack of sympathy, was one which, if closely examined by any responsible person in the country, would be at once repudiated. General practitioners associated themselves with those who knew a great deal more than they did about the actual experiments and recognised their value in everyday practice. He mentioned particularly the testing of drugs and the treatment of cardiovascular and digestive disorders. He failed to see how anyone could consistently support this Bill unless prepared to refuse the chief medical aids which his doctor could give him. Much was heard nowadays of the importance of research work by general practitioners, but this research could not begin on human beings: it must receive its impetus from animal experiments. If the medical profession were going to create such a public opinion as would prevent the annual recurrence of such absurdities as this Bill, it was the genera practitioners who must play the greatest part. This was no easy task, and it required a good deal of courage for doctors to tackle their patients on the question. He was certain, however, that there was a very large body of people sincerely anxious for and willing to accept guidance, and he urged practitioners to throw themselves into the campaign, and to make opportunities where none were offered.

General Discussion.

Lord LAMINGTON (Research Defence Society) spoke of the persistence of certain highly-placed supporters of the Bill and the necessity for energetic counter-measures.

Mr. E. W. MOSS BLUNDELL (*Field* Distemper Fund) pointed out that the work on distemper was for dogs, but would probably lead to the relief of human diseases. The work was progressing admirably and receiving enthusiastic support from all over the world. Its stoppage by legislation would be a calamity and a bitter disappointment to dog-lovers everywhere.

Lieut.-Colonel F. E. FREMANTLE said that the real difficulty to be countered was the feelings of dog-lovers who were blinded by their love, and were impervious to argument. A statement as to how much animals in general and dogs in particular had benefited by experiments would be very useful in dealing with these people.

Prof. F. T. G. HOBDAY described his experiments on the use of chloroform for veterinary operations and related the horrors of the pre-anæsthetic days. For these experiments he had had to obtain the most "brutal" licence and was now branded as a vivisector, but truth must prevail.

LIVERPOOL MEDICAL INSTITUTION.

A MEETING of this Institution was held on March 17th, when Dr. R. W. MACKENNA read a paper on

Psoriasis.

It was a reproach to the profession, he said, that though psoriasis was one of the most ancient of recognised diseases, there was as yet no certain means of curing it. Its cause was still unknown, though undoubtedly a definite familial tendency was traceable in about 30 per cent. of cases. The determining cause of the first outbreak was usually some slight trauma, but once a person had had an attack he was likely to suffer from recurrences all his life. The psoriasis papule, the initial lesion, was a characteristic pathological entity, and it should be possible to diagnose the disease from a single papule. The appearances produced by systematic curetting (grattage) were very characteristic, and Dr. MacKenna demonstrated by photographs of sections the anatomical conditions on which they depended. He also gave an account of experimental observations, made with the help of Dr. Elizabeth Hunt, in his clinic at the Royal Infirmary. No new and certain method of curing the disease had, however, been discovered.

Dr. R. E. ROBERTS and Mr. ST. GEORGE WILSON contributed a note dealing with

The Treatment of Menorrhagia by X Rays.

Thirty-four cases had been treated, and it had been found that the technique adopted should vary according to the patient's age. In older women the object was to bring about an artificial menopause, whilst in younger ones—those under the age of 40—the aim was to avoid, if possible, any interference with fertility except as a last resort. A dose that would cause sterility in a patient over 40 years of age would not have the same effect in a younger woman, which meant that there was a bigger margin for submaximal dosage in younger subjects. If, however, it was finally decided to sterilise such patients it would take longer to bring about the desired result. In older women a permanent amenorrhœa had been in every case successfully produced by X rays. In the younger

group an amelioration of symptoms was brought about in most of the cases by submaximal dosage, and it was rarely necessary to proceed to complete sterilisation. Most of the cases had been treated unsuccessfully by other means before X rays had been tried. Dr. Roberts and Mr. Wilson also referred to irradiation of the spleen as an adjunct to the treatment of excessive bleeding, and to irradiation of the ovaries by very small stimulating doses in the treatment of primary amenorrhœa. Too few cases of amenorrhœa had been treated in this way to allow of any conclusions about its value.

Reviews and Notices of Books.

LISTER AS I KNEW HIM.

By JOHN RUDD LEESON, M.D., C.M. London: Baillière, Tindall and Cox. 1927. Pp. 212. 8s. 6d.

THE work of great minds endures long after the earthly temples of the body have dissolved in dust; of that work later generations will have cognisance, but the personal characteristics and mode of life of the worker will often be hidden, although of absorbing interest to those who have not had the opportunity or the privilege of personal relations with him alive. Lister's labours, by which he converted operative surgery from what was—before his teaching began to take effect—in many cases, and necessarily, a death-dealing art, to one which is in verity a life-giving one, are known to all men, to the public now as well as to our profession, but the personality of the man himself, as he appeared to his contemporaries and to those who had the honour of working with him is still largely concealed, despite Sir Rickman Godlee's biography and the published estimates of a group of early and devoted followers. Hence the appearance of Dr. Leeson's book in this centenary year of Lister's birth is timely.

The book is very simply written by a faithful disciple who had and has, as any disciple of Lister must have, a whole-hearted reverence and love for his teacher. Dr. Leeson commenced medical study at St. Thomas's Hospital, which was removed from the Borough to its present site near Westminster Bridge in October, 1871. The site was new, as airy a one as could be found, and there was as much chance of sunlight as is possible in London, the building was new, the fittings were new, and the nurses were of the new school of Florence Nightingale. Never did an institution start less weighed down by evil heritage. Sir John Simon, who had been assistant surgeon at King's College Hospital (where Lister was afterwards to preach to audiences mostly apathetic), was one of the surgeons, and was also the first medical officer of health for the City of London and medical officer under the Public Health Act. Everything to all appearance that could make for the successful healing of wounds was present at St. Thomas's Hospital by Westminster Bridge. "And yet," Dr. Leeson says, "as far as surgery was concerned . . . pyæmia, septicæmia, and erysipelas were as rife as ever." And the student of those days knew very much about the working of the wards, though the medical curriculum occupied only two and a half years when Dr. Leeson joined his medical school, of which term the first year was taken up also with dissecting and attending lectures. The spare time was devoted to walking the hospital. Leeson on arriving at the latter portion of this time, which to-day, seems so terribly inadequate, asked one of the staff, the great Charles Murchison, how he had best spend this eighteen months and Murchison then gave this remarkable answer: "If I were you, Mr. Leeson, I should not spend the whole of my time at St. Thomas's, I should go to Edinburgh and follow the practice of Professor Lister; I believe there is a great future before his work and that it is well worth your while to study it." And it may be noted that shortly before this advice was given a series of papers was running in THE LANCET by Murchison, in juxtaposition to Lister's earliest reports of his results.

Accordingly, armed with letters of introduction from Murchison to Lister and Grainger Stewart, the young student arrived in Edinburgh in the summer of 1873 and was admitted to Lister's wards. They were dark, gloomy, and sunless, but the patients were cheery and comfortable, there was little pus, no pyæmia and no putrid wounds, and there was—Mr. Lister. Consider what an impression the place, the work, the results of the work, and the personality of him to whom these results were due must have made upon a young and receptive mind fresh from the horrors of the ordinary surgery of those days. Dr. Leeson manages to make us realise something of his feelings. He became dresser, then surgical clerk, and he describes with vivid touches Lister and his methods, his passion for accuracy and attention to detail, his never-ceasing personal interest in each patient, his kindliness, his courtesy, his modesty, as when he would say, "Never be afraid of confessing your mistakes, it is cowardly not to do so, and it may prevent others from falling into like error." In 1877, when Lister migrated to London as professor of surgery at King's College in succession to Sir William Ferguson, he offered to take his old clerk with him, but circumstances forbade the acceptance of the offer. Besides the personal recollections of Lister, Dr. Leeson supplies an excellent résumé of the history of antiseptics, the development of antiseptic dressings, and a description of an operation by Lister in the early days of the system when the spray was still in use.

The book is well done. Not only all medical men of the younger generation should read it but lay folk as well.

DIABETES MELLITUS.

The Pathology and Treatment of Diabetes Mellitus. Second edition. By GEORGE GRAHAM, M.D., F.R.C.P., Assistant Physician, St. Bartholomew's Hospital. London: Humphrey Milford: Oxford Medical Publications. 1926. Pp. 230. 8s. 6d.

THE appearance of the second edition of this work will be welcomed by research workers and practitioners alike. It is not only a concise enunciation of the present state of knowledge of carbohydrate metabolism, but this edition also contains practical information, invaluable to those who watch over the progress of diabetics in their daily lives, in a newly added chapter entitled Details of Treatment with Insulin. The first three chapters of the book, which deal with the distribution, storage and physiological regulation of sugar in the body, have been brought up to date; it is important to note that insulin is only one, though the most important, of the substances produced in the body contributing to the regulation of the blood-sugar; the part played by adrenalin, thyroxin, and pituitrin is probably considerable. A new chapter follows in which the history of the discovery of insulin is summarised and its properties and mode of action are set out, as far as they are at present understood. So far as the muscles are concerned, insulin, it is suggested, converts glucose into a new kind of glucose (neo-glucose) but stores the dextrose as glycogen, while the glycogen in the liver bears no direct relation to insulin.

With regard to treatment, Dr. Graham is strongly in favour of the ladder diet as opposed to the maintenance diet extensively used in the U.S.A. and Canada, which is, however, detailed in a special appendix. His reasons for this preference are: (1) the more rapid relief of symptoms; (2) the possibility of forming, under conditions of temporary fasting, a more accurate estimate of the severity of an attack; and (3) the valuable psychological effect on the patient who learns early to understand the principles of the treatment of his complaint. The sense of well-being in patients treated with insulin is emphasised as more than compensating for the minor inconvenience of a daily injection. Most diabetic patients below the age of 40 require insulin, and Dr. Graham finds that

patients between the ages of 40 and 60 are able to lead more active lives on a small daily injection. For young children he finds that a standard of from 2 to 4 g. of protein per kilo is necessary to maintain growth and development, and if this ration cannot be taken without the help of insulin the drug must be given. Symptoms of over-dosage of insulin are well described and their treatment by sugar, adrenalin, and pituitrin is set forth. Finally, methods of effecting exchanges in the diet, which otherwise tends to become too monotonous, are detailed, a special appendix on food values being included at the end of the book. Diabetic foods are prohibited unless their percentage composition of fat, carbohydrate, and protein is clearly stated. In the last chapter the causation and treatment of diabetic coma are dealt with. Dr. Graham considers it safer to give 2 oz. of dextrose together with the insulin to ensure a sufficiency of sugar in the body.

The book is an admirable summary of the theory and practice of the most modern methods of treating diabetics.

CLINICAL PEDIATRICS.

By JOHN LOVETT MORSE, A.M., M.D., Professor of Pediatrics, Emeritus, Harvard Medical School. London and Philadelphia: W. B. Saunders Co. 1926. Pp. 848. 42*s*.

Prof. Morse states in the preface to this book that, while he hopes that it may be interesting to students and practitioners, it was written primarily for his own amusement. The author finds much to entertain him in many of the current methods of treatment and the theories on which they depend, and he brings to bear upon them a wealth of shrewd criticism and no little humour. He holds strong opinions and presents them dogmatically, which the student will appreciate. One of the most interesting and original parts of the book is that devoted to dyspepsias and alimentary toxæmias; the account given both of the significance of symptoms and of the indications of treatment will be really helpful to the practitioner. Prof. Morse is insistent in warning the reader against the common tendency to assume that acidosis is the cause of all conditions associated with acetonuria. Short, readable accounts are given of the fevers, and there is an admirable chapter on tuberculosis. The chapters on infant feeding will disappoint those who desire to simplify the subject, since the use of somewhat complicated milk formulæ for individual infants is expressly advocated. In view of the great experience of the author, and the attractive style in which the work is written, it is likely to find a place among standard text-books on the subject.

PSYCHO-ANALYSIS.

Further Contributions to the Theory and Technique of Psycho-analysis. By SANDOR FERENCZI, M.D. Compiled by JOHN RICKMAN, M.A., M.D. Authorised translation from the German by JANE ISABEL SUTTIE, M.A., M.B., Ch.B., and others. London: Hogarth Press. 1927. Pp. 473. 28*s*.

THE bibliography of Dr. Ferenczi's writings, printed as an appendix to this volume, shows the gradual transference of his interest from organic neurology to psycho-analysis, which he has practised for eighteen years; since he holds a prominent position among psycho-analysts this collection of papers may be taken to represent authoritative views. Most of them are written for those engaged in the speciality, and the section on technique discusses methods of "active therapy" designed to stimulate patients in whom free association has reached a dead end. These consist chiefly of depriving the patient of some pleasurable activity, the most striking being the setting of a limit to the analysis, and they seem to have roused the opposition of his more conservative colleagues. Apart from this internal controversy a few polemical essays are to be found in the section on nosology. Analytical findings are given in two cases showing hysterical anæsthesia, in one the loss of sensation being connected with the memory of a trauma, whilst, in the other, it is a true stigma representing unconscious phantasies. We may accept these statements and yet question the entire repudiation of Babinski's explanation that hysterical anæsthesia is suggested by the doctor. This explanation was the result of clinical experiments that have been confirmed by other observers and Ferenczi's dismissal of it is as unsatisfying as Babinski's theory that hysteria is nothing but suggestion. The chapters on the general theory of the neuroses are suitable for the ordinary medical reader, but some of the later portions will be unintelligible to him. Dr. Rickman in an introductory note praises the imaginative quality of the author, and compares the understanding of psycho-analytical literature with that of mathematical science; according to him understanding in each case is a matter of unconscious mental adjustments, the adjustment in mathematical science being almost entirely intellectual and in psycho-analysis almost entirely emotional. The acceptance or rejection of psycho-analytical observations is often emotionally determined, but some chapters in this book—that, for example, on the acceptance of unpleasant ideas—demand serious intellectual effort. There seems no link between the theories enunciated in that chapter and whatever material they are presumably based upon. Easier and of more practical use are the chapters on medical jurisprudence and criminology, though either emotion or intellect urges the rejection of the view that the Œdipus myth, found alike in savage totemism and the unconscious of the civilised, represents an actual tragedy in the history of mankind. The book is decidedly uneven but will be welcome to those who wish to enlarge a previous knowledge of the subject.

The Ego and the Id. By SIGM. FREUD, M.D., LL.D. Authorised translation by JOAN RIVIERE. London: Hogarth Press. 1927. Pp. 88. 6*s*.

THERE have been many systems of psychology which sum up, if they do not explain, general principles of human behaviour. Freud, having explored the repressed material of the unconscious, here attempts to set up his own system covering mental activity in general. Nietzche used the term *das Es* (the id) for whatever in our nature is impersonal; Groddeck, following him, used it for the unknown and uncontrollable forces by which we are "lived"; Freud looks upon the mind of the individual as an unknown and unconscious id upon whose surface rests the ego, developed from it by the direct influence of the external world. But there are qualities in human nature—the higher, moral or spiritual qualities—which, as Freud says, psycho-analysis has been reproached for ignoring. These he ascribes to an ego-ideal or super-ego, formed during the phase when the Œdipus complex is mastered and permanent expression is given to the influence of the parents: the parents are perceived as the obstacle to the realisation of the Œdipus wishes and the child's ego erects the same obstacle within itself, thus establishing the domination of the super-ego in the form of conscience or the categorical imperative. Since the ideal is set up in opposition to the unconscious instinctual trends, its connexion with them leads to the super-ego itself being to a great extent unconscious and inaccessible to the ego.

From the psycho-analytical point of view these differentiations within the mind are supported by clinical findings and are, indeed, formulated as a working hypothesis to explain them. Further considerations involving the supposition of a death instinct are frankly more speculative and decidedly more obscure. On page 55 we read that the self-preservative instinct must be assigned to the ego, and the effort to understand how an instinct can belong to a part of the mind that has developed as a perceptual system is only one among many demanded. One finishes the book with the regret that orthodox psychologists are still too remote from psycho-analysis to help it with effective and useful criticism. Some of the basic problems of psychology are here considered and it should be possible to find a relation between the Freudian point of view and that of other workers.

PRACTICAL NURSING.

For Male Nurses in the R.A.M.C. and other Forces. Second edition. By E. M. and A. R. HASSARD. London: John Bale, Sons and Danielsson, Ltd. 1927. Pp. 407. 4*s*. 6*d*.

THE second edition of this excellent book has been brought up to date by various notes on modern methods such as insulin, and by a chapter on radiant heat, electricity, and massage, contributed by Miss Shinkwin. We can find no reference either in the index or the text to the technique of giving of salines or of fixing the patient in Fowler's position. Those practical details which are included are given clearly and fully, and the commonest error of text-books on nursing is avoided—namely, that of giving enough detail to obscure the principles, yet not enough to enable the reader to carry out the procedure in practice. The military pattern of handbook exemplified in manuals on drill and ceremonial is well adapted for the purpose of giving exact directions. The arrangement of the subject matter seems unmethodical, but, on the whole, the ground is well covered and the book should have a much wider appeal than to those indicated in the title.

CAVERNOUS SINUS THROMBOPHLEBITIS.

By WELLS P. EAGLETON, M.D., Medical Director, Newark Eye and Ear Infirmary. New York: The Macmillan Company. 1927. Pp. 196. 20*s*.

THIS monograph deals with a grave condition. The author states that of 25 cases under his observation only four recovered. He divides the cases into groups by distinguishing the source from which the infection reached the sinus, justifying a somewhat elaborate classification by variations in the operative technique which the different cases require. The operative methods he suggests are certainly courageous, consisting in preliminary ligation of the common carotid followed by drainage of the cavernous sinus by a route which depends on the source of infection. That he should have succeeded in saving four patients in this desperate condition is a strong recommendation for the methods he adopts. The actual cases are described in the utmost detail so that the reader is able to form his own conclusions as to the treatment adopted in each. The volume furnishes in a convenient form all the information at present available on a dangerous complication which is fortunately rare.

READABLE PHYSIOLOGY AND HYGIENE.

By J. ARGYLL CAMPBELL, M.D., D.Sc., Member of the Research Staff, National Institute for Medical Research, Hampstead. London: G. Bell and Sons, Ltd., 1927. Pp. 229. 3*s*. 6*d*.

THIS book, intended for beginners, is the latest addition to "Bell's Natural Science Series." It is, indeed, a readable little volume, and well illustrated. The book is up to date in several respects; not only does insulin find a place, but the distinction between vitamins A and D is explained, and an account is given of "oxygen debt." The smoke nuisance is discussed and the danger of odours to health, a popular scare, is satisfactorily disposed of. But the author does not seem to have realised that a modern text-book, even for young children, must deal with all the systems of the body. There is no satisfactory account of the kidneys, nor indeed of the excretory channels at all and the physiology of sex is ignored except for a short paragraph (p. 23) on the growth of the ovum. The kidneys and generative organs are mentioned in a table on p. 14, but the child's curiosity having been aroused Dr. Campbell fails to satisfy it. Perhaps in a future edition these omissions will be rectified, for the attention given to the historical aspect of physiology makes this book a better introduction to the subject than some others which give the false idea that all has long been known about the functions of the human body.

Reports and Analytical Records.

SISTOMENSIN.

(CLAYTON ANILINE CO., LTD., UPPER THAMES-STREET, E.C. 4.)

SINCE the publication of a leading article on March 12th we have received from the Clayton Aniline Company samples of Sistomensin, an ovarian extract prepared under E.P. 113,311. We arranged for biological tests of these samples and the results are detailed below. We have, therefore, pleasure in withdrawing the statement that none of the commercial material which has reached this country appears to fulfil the biological test of producing œstrus when injected subcutaneously into a female rat. We regret that an incorrect impression of the potency of Sistomensin should have been conveyed.

Rat.	Resting S.	Dose.	23/3/27.	24/3/27.	25/3/27.	26/3/27	Result.
		c.cm.					hrs.
A6	DE	0·5	PE	PE	?	PE	–
B3	DE	1*	PE	E	ME	Rem.	+48
C1	DE	1	PE	PE (E)	(VP) E	ME	+60
C4	DE	0·5*	PE	PE	PE (E)	E	+60
C5	DE	0·5	DE	DE	PE (E)	E	+60
C6	DE	0·3	DE	PE	PE (E)	E	+
D3	DE	0·3	PE	E	(VP) E	—	+48
D4	DE	0·2*	DE	PE	PE	ME	?
D6	DE	0·2	DE	PE	PE	DE	–
E1	DE	0·2	DE	? PE	DE	? E	?
E3	DE	0·25	DE	PE	PE (VP)	E	+72
E4	DE	1	PE	PE (E)	(VP) ME	ME	+60
E6	DE	0·5	PE	PE	PE	PE	?

* Not mated. DE = Di-œstrus. PE = Pro-œstrus. E = Œstrus. M.E. = Meta-œstrus. Rem. = Remains. VP = Vaginal plug.

3 rats, 1 c.cm. .. .. .. all positive.
4 rats 0·5 c.cm. .. .. .. 3 positive, 1 negative
2 rats 0·3 c.cm. .. .. .. 2 positive.
1 rat 0·25 c.cm. .. .. .. positive.
3 rats 0·2 c.cm. .. .. .. doubtful.

Unit = 0·25 c.cm.

STOCK'S MEDICINAL BRANDY (THREE STAR).

CAMISS AND STOCK, DISTILLERY, BARCOLA.

WHOLESALERS, DISTRIBUTORS FOR THE UNITED KINGDOM, AND EXPORTERS: V. CANOVA AND CO., 20, PICCADILLY, LONDON, W. 1.

On analysis this brandy gave the following results:—

Alcohol, by volume	40·0	per cent.
Proof spirit	70·0	" "
Alcohol under proof	30·0	" "
Extractives	0·85	" "
" containing sugar ..	0·75	" "

Secondary products expressed as parts per 100,000 of absolute alcohol present:—

Acidity (acetic acid)	60
Aldehydes	31
Furfural	3
Esters as ethyl acetate	176
Higher alcohols	130

A consideration of these secondary products indicates that the brandy is pure and that it has not been blended with neutral spirit. The palate is mellow and agreeable, and the brandy is obviously suitable for medicinal purposes.

GROWTH OF THE ROYAL NORTHERN HOSPITAL.—At the annual Court of Governors it was reported that, at 4965 last year, the number of out-patients had more than doubled since 1914. There are now 400 beds and the maternity department has double the applicants for beds that can be accommodated. The X ray department is being rebuilt and last year more than 12,000 light treatments were given. The income has increased from £24,000 in 1913 to £81,000 last year. The average cost of each patient in 1926 was £3 15*s*. 6½*d*., and a small fractional reduction in the average cost of each of 241,000 out-patient attendances has saved £900. The year's work left a deficit of £7780, which was more than accounted for by a decrease in legacies.

THE LANCET.

LONDON: SATURDAY, APRIL 9, 1927.

LISTER.

THE week now ending has seen a memorial triumph unparalleled in any branch of human endeavour. From all countries, and various sources in those countries, there has come a general endorsement of the view held by the medical profession that LISTER'S work has effected more for the happiness of the world than any work of any one man. No man's work is his own single production, and LISTER, like NEWTON, employed in his great centralisation the brilliant researches of others, notably of PASTEUR, whose chemical investigations of putrefaction directed the great surgeon in his search for the control of sepsis. There is no necessity to swell here the fully merited chorus by giving any detailed story of LISTER'S discoveries and procedures. If we admit that there might have been this necessity 25 years ago, it is only to point out that thereby LISTER'S fame is enhanced, for it is shown to have grown with the passage of years; it is the incidental discovery which requires rediscovery, while the leader of the successful revolution goes from height to height in the world's esteem as the fruits of that revolution become more abundant and more demonstrable. We confine ourselves to publishing certain tributes from pure science, from applied science, and from the science of surgery, as voiced by recognised leaders in memorial discourses delivered in London on Wednesday. Other tributes are recorded from one who was his house surgeon in the critical era when he left behind him the convinced audiences of Scotland and arrived in the metropolis as an evangelist; from a past President of the Royal College of Surgeons of England indicating briefly how LISTER had definitely extended the opportunities of surgery for the saving of life and the abolition of pain and deformity; and from a past President of the Royal College of Physicians of London, whose words spoken in the church of LISTER'S birthplace drew a picture of LISTER, the man.

The reason of these tributes may be found in a short article, reprinted from a volume of THE LANCET published exactly 60 years ago, in which LISTER gave his first message to the medical profession at large respecting his great discoveries. The passage quoted is from the opening of an extended series of communications dealing with compound fractures upon antiseptic lines, and we can but admire the wide vision, the accurate knowledge, and the simplicity with which the message was delivered. The written words exactly fit the various character pictures. In 1867 we are back in a time when it was the rule for an open wound to heal up by a process of suppuration, when the unfortunate victim of a compound fracture was submitted at once to amputation in view of the risks from septic fever, and of the frequent occurrence in surgical wards of deaths from gangrene or pyæmia. At this early stage of his researches LISTER was able to show that many of these terrible conditions could be avoided by the routine treatment by the application of carbolic acid to the exposed surfaces or abscesses. And he is content to leave his words to be judged by his colleagues, to them "that follow after righteousness." There is abundant evidence throughout the report of the scientific gift and assiduous research that must have been precedent to them, but not a word of personal protest. As His Majesty the King said when receiving at Buckingham Palace on Monday last the delegates of the Lister Centenary from all parts of the civilised world: "LISTER removed the horrors of sepsis from surgical operations, and for this he is rightly described as the father of modern surgery." He filled this position, which by acclaim was allowed him during his life with a simplicity that was as remarkable as his claims were pre-eminent.

PRISONS AND PRISONERS.[1]

THE latest official report on British prisons is distinctly reassuring, for it everywhere reveals dissatisfaction with the present system, and a determination to see it improved. Prison reform depends so much on national sentiment and arouses such formidable opposition, that progress must necessarily be slow, but each step forward represents a real moral gain. One hopeful sign of advance is the decrease in receptions; in 1925–26 they were 882 less than in the previous year, and those in turn were 2597 less than in the year before. Even more striking is the contrast between recent times and those before the late war; for whereas in the first five years of King Edward's reign the average yearly convictions per 100,000 population were 512, those for 1925–26 were only 110. The chief factors in this decline have been probation, allowance of time in which to pay fines, the working of the Mental Deficiency Act. The activities of the various prisoners' aid organisations, and the training given during imprisonment, have also contributed. Much, nevertheless, remains to be done, and however gallantly voluntary workers may strive to make up for deficiencies in legislation, no further great advance will be made until these deficiencies are remedied. One of the outstanding causes of failure in the present system, perhaps, is the infliction of short sentences. The prospect of prison is a strong deterrent to those who have never been there, but to make sentences short is to take away much of their prophylactic effect upon others. Moreover, no system of prison training can work smoothly if many of those subject to it are only kept for a few days, and can therefore be taught nothing but the simplest work. Alternatives, however, are difficult to suggest; one possible line of improvement is by developing the probation system, but this is itself open to abuse, and leaves a great deal to the discretion of the police.

The second grave deficiency in the system is the detention of many mentally defective or disordered persons, for whom prison is an unsuitable environment. It is the practice of some judges and magistrates, in dealing with offenders whose mental soundness is doubtful, to pass sentence without asking for a medical report or before a report has been obtained. It is so easy for a court to obtain a report on the state of a prisoner's mind, and meanwhile to hold him on demand, that little can be said in defence of this practice. Fortunately it is not very common, but even if it ceased altogether, a considerable number of mental defectives would still be put in prison, because of a clause in the Mental Deficiency Act that requires proof of the defect having existed "from an early age." This excludes, for instance, the post-encephalitic

[1] Report of the Commissioners of Prisons and the Directors of Convict Prisons for 1925–26. London: H.M. Stationery Office. 1927. 1s. 6d.

delinquent. The real problem is found in the borderline case of deficiency or insanity, in which lawbreaking is due, not so much to a defective intelligence as to an emotional abnormality, and where the prisoner's mental abnormality is so elusive as to put him out of reach of certification under the existing Acts. This type of prisoner cannot be sifted out of the present system by any measures except the enactment of a completely new standard of mental fitness, and the provision of institutions where he could be cared for, studied, and, as far as possible, improved. If he could thus be eliminated, the prison system would be freed from one of the chief obstacles in the way of its evolution into what the Report calls "a place for hard work, discipline, and education, with a view for rehabilitation on completion of the sentence."

An International Penitentiary Congress was held in London in 1925, and its resolutions showed full recognition of the need for this reform. Before, however, any scheme can be drafted for discussion by Parliament, it is necessary to know two things. One is the standard by which the medical officers of prisons would decide what prisoners they would recommend for special treatment. The second is the approximate number of prisoners for whom special accommodation would be necessary. If these two points were determined with the authority of the Prison Commissioners, it should be possible for the Government to frame legislation providing for execution of the work by voluntary bodies under State direction and subsidy—an arrangement which works, passably well, at any rate, in many other departments of social welfare. The evidence in favour of the principle is overwhelming, and, if a practical scheme could be put before Parliament, there is little doubt that it would become law.

ENCEPHALITIS, HERPES, AND ALLIED DISEASES.

IN spite of the vast amount of experimental work undertaken in the past few years on the experimental transmission of encephalitis lethargica to animals, the precise nature of the ætiological agent is still unknown, and the question of definite experimental transmission remains unsettled. Nor has the relationship between this disease and herpes been satisfactorily defined. The evidence brought forward recently has done little to clarify the situation, but the facts are worth noting, if only to emphasise the difficulties of the problem. Japanese workers have been concerned with the blood picture of the disease and with its histological characteristics. The Tokyo Institute for Infectious Diseases includes in its Scientific Reports for 1925 two papers on the severe epidemic in Japan in the late summer of 1924, when over 6000 cases were officially reported with a 55 per cent. mortality. M. ONO and S. KOJIMA found a neutrophil leucocytosis in the first week, together with a reduction of lymphocytes and eosinophils. During the second week the neutrophil leucocytes decreased in number, to be followed in the third week by a relative and absolute lymphocytosis. The blood picture only returned to normal after several weeks. M. NISHIBE contributes his views on the vexed question as to what histological appearances may be regarded as typical. He inoculated 94 rabbits, mostly subdurally, with brain emulsion and cerebro-spinal fluid from human material. Histological examinations of the brains of these rabbits showed round-cell infiltration of the meninges in 7·4 per cent. and perivascular infiltration in 5·3 per cent. Control uninoculated rabbits showed similar meningeal and perivascular infiltration in 9·1 and 13·6 per cent. respectively, these lesions being due to spontaneous meningoencephalitis in the rabbit. The presence of these round-celled infiltrations is, therefore, not considered by this observer to be due to human encephalitis virus. NISHIBE holds that the essential lesions of experimental encephalitis are widespread and marked degeneration of ganglion cells with vacuolation, disappearance of Nissl's granules, neuronophagy, hyperæmia, and small hæmorrhages. The changes occur chiefly in the thalamus and midbrain, but any portion of the central nervous system may show lesions. Using these changes as a criterion of experimental epidemic encephalitis NISHIBE concludes that the virus is pathogenic for rabbits, is filtrable and transmissible.

Two French workers, J. DECHAUME and F. LEBEUF (*C.R. Soc. de Biol.*, 1926, xcvi., 43), also describe the results of intracranial inoculation of young rabbits in the meningeal space with emulsion of cortex, midbrain, and spinal cord taken aseptically from a fatal case of encephalitis lethargica 36 hours after death. After an incubation period of six days one animal showed some degree of rigidity of the limbs, torpor with intervals of jerking of the feet, and died 24 hours later. Cultures from the brain of this rabbit were consistently negative, but histological examination showed perivascular and meningeal infiltration with lymphocytes, increase of neuroglia nuclei, and degeneration of nerve-cells, as evidenced by disappearance of Nissl's granules and vacuolation of nuclei. A second rabbit was inoculated with brain emulsion from this animal, showed no symptoms, and was killed on the eighteenth day after inoculation. A similar histological picture was observed. A third rabbit inoculated with material from the second showed no symptoms within a month. The authors claim to have transmitted encephalitis lethargica to the rabbit, and do not consider that the above findings are due to the spontaneous meningo-encephalitis of the rabbit. The histological appearance of the brains of rabbits suffering from herpetic encephalitis is the subject of a recent paper by C. DA FANO (whose premature death we recorded last month) and J. R. PERDRAU. According to these observers the changes are extensive meningeal perivascular and parenchymatous infiltration, atrophy of nerve-cells, and disintegration of nerve-tissue, true and pseudo-calcification, reactive changes such as new production of blood-vessels, proliferation of connective tissues, and hyperplasia of neuroglia cells. The changes are totally different from those found in the spontaneous meningo-encephalitis of parasitic origin, and are considered to be specifically herpetic. When fresh these brains are non-infective, but when preserved in glycerol the virus of herpes can again be recovered. These lesions in rabbits resemble more closely the picture of encephalitis lethargica in man than the acute herpetic disease described by numerous authors.

LEVADITI'S name is everywhere associated with a series of able researches on the question of the possible relations and differences between the varieties of herpes, and of the apparent connexions between the latter and other toxi-infective states of the encephalitis class. He has recently set out his ideas in a fine monograph,[1] which deserves perusal from cover to cover; whether the reader agrees with the conclusions or not is in reality almost a secondary consideration, for he will learn much in studying LEVADITI'S scientific method and cautious deductions. Briefly, the thesis set forth is to the effect that herpes and zona (herpes zoster) are clinically and ætiologically distinct on the one hand; on the other, they are equally infective and contagious, and the virus of each belongs to the neurotropic category. The major part of the volume treats of the author's personal experimentation in support of these views, and is replete with well-systematised data, the cumulative effect of which on the reader's mind is impressive if not absolutely convincing. Much care is devoted to the interesting theory that the

[1] L'herpès et le zona: ectodermoses neurotropes. By C. Levaditi, Pasteur Institute, Paris. Paris: Masson et Cie. 1926. Pp. 388. 5s.

virus of herpes (*sensu strictiori*) is identical with that of epidemic encephalitis, though in this respect repetition of the experimental evidence seems called for, as we feel rather too much reliance is placed on an individual series of researches. More speculative, perhaps, are the author's explanations of the way in which the virus passes from the skin by neural routes to the neuraxis; he coins the term "neuroprobasia" (neural advance, we might) say for this, imagining that the virus, once introduced in the protoneurone, proceeds forward by cultivating itself locally in successive neuronal segments and leaving behind it tissues self-vaccinated against it. In the current issue of the *British Journal of Dermatology and Syphilis* J. R. PERDRAU reviews his own recent work on herpes and encephalitis, upholding LEVADITI'S view of the identity of the viruses. In the same journal A. C. ROXBURGH contributes an interesting article on the relations of the facialis, zoster, and genitalis varieties of herpes, particularly from the clinical aspect. The relationship of herpes zoster and varicella is discussed, and the author thinks that a large number of cases of spontaneous zoster are due to the same virus as varicella, and cites a number of problems regarding the connexion between these two diseases. In another paper S. P. BEDSON shows that the fluid from certain human bullous lesions (other than herpes facialis and zoster) when inoculated intradermally into the plantar epidermis of the guinea-pig produced lesions characterised by vesicle formation and similar to those produced by herpes and foot-and-mouth disease. The infective agent can be transmitted through a series of guinea-pigs and is immunologically different from febrile herpes. The nature of the virus is as yet unknown, and these observations should stimulate further work on the subject. German observers, E. GILDEMEISTER and K. HERZBERG (*Deut. Med. Woch.*, 1927, i., 138), have also studied the interrelationship of variola, herpes, and foot-and-mouth disease, using the intracutaneous method of inoculation into the plantar epithelium of the guinea-pig. Their experiments show that in guinea-pigs inoculated as above with herpes there is a partial immunity to variola. A similar immunity exists between variola-immunised animals and herpes. This partial cross-immunity is definite and specific. On the other hand, there is no immunological relationship between foot-and-mouth disease and herpes. Whatever the difficulties of interpretation revealed by these results, the problem appears worthy of closer study than it has yet received.

NEWCASTLE-UPON-TYNE MOTOR ACCIDENTS.—The 176th annual report of the Royal Victoria Infirmary, Newcastle-upon-Tyne, states that last year 986 persons were treated for accidents directly due to motor traffic, 432 of whom were retained as in-patients. This is double the number of the previous year, with the consequence that one ward is occupied nearly all the year round with cases of this description, and that the waiting-list is greatly lengthened; the number on the list at the end of the year was 2100. The average stay of in-patients was 15·3 days. Out-patient attendances increased by nearly 44,000. Expenditure exceeded income by £9835. The whole situation of the hospital's needs is under consideration.

FELLOWSHIP OF MEDICINE AND POST GRADUATE MEDICAL ASSOCIATION.—The special courses in April will not start until the end of the month. The first will be a course in Medicine, Surgery and Gynæcology at the Royal Waterloo Hospital for Women and Children, beginning on April 25th, and lasting for three weeks. (Fee £3 3*s*.). On April 26th will be given the first of eight clinical demonstrations on Tropical Diseases, to be held at the London School of Hygiene and Tropical Medicine on Tuesdays and Thursdays at 2.0 P.M. for four consecutive weeks. The more important tropical diseases will be illustrated as far possible by cases in the hospital, and the fee will be £2 2*s*. Four lecture-demonstrations on Treatment by Electrotherapy will be given by Dr. C. B. Heald at the Royal Free Hospital, on Wednesdays at 5.15 P.M. beginning on April 27th; the fee for the four demonstrations will be £1 1*s*. Copies of all syllabuses, of the General Course programme, and of the *Post Graduate Medical Journal* are obtainable from the Secretary of the Fellowship at 1, Wimpole Street, London, W.1.

Annotations.

"Ne quid nimis."

MOTORISTS AND THIRD PARTY RISKS.

AN important decision of the law of motor-car insurance will interest the medical profession which, more than any other, is daily exposed to the risks of the road. In June, 1925, a motorist who had been to a wedding and had had too much to drink collided with a motor-bicycle on which were two young Army officers. One of the two was killed, the other was injured. The motorist was charged with the manslaughter of the one and with unlawfully wounding the other. He was convicted of the manslaughter and was sentenced to 12 months' imprisonment; the charge of unlawful wounding was not proceeded with. In addition to these criminal proceedings there was a civil action in which the surviving subaltern recovered £1500 damages and costs; the defendant motorist incurred costs in defending himself in both these actions. The latter thus had a big bill to pay; but the motor-car in which he was driving at the time of the accident was the subject of an insurance policy, and he therefore claimed to be indemnified in respect of the accident. The insurance company repudiated liability on the ground that the motorist was committing criminal acts in that he was drunk and was driving to the danger of the public; thus he increased the risk borne by the company, and it was contrary to public policy that he should be indemnified against the consequences of his criminal acts.

In a judgment which the insurance company will probably take to a higher court, Mr. Justice Roche held that the company must pay up on the policy because the motorist's criminal act was negligent and not deliberate. If the motorist had too much to drink at the wedding, it was both foolish and wrong; his lordship was, however, not prepared to hold that the motorist deliberately put himself into a condition of drunkenness and in that condition drove the car, nor to hold that there was such a degree of criminality as made it contrary to public policy that he should recover on the indemnity. It was difficult to believe that this motorist was any worse morally than people who in their sober senses drive to the danger of the public. Both are guilty of negligence for which they are liable in a criminal court, but in neither case is the injury intended. If he had had to decide that this motorist could not recover on his insurance policy, it would have meant that nobody who was driving to the public danger could rely on his insurance. "Unless I am compelled by decided cases to hold otherwise, I think it would be altogether contrary to public policy to hold that a man could not cover by insurance his liability to third persons arising out of dangerous driving; it would be a serious thing if juries, magistrates, and judges had to know that, if a man were convicted of any offence, the injured party could not recover any effective damage."

The decision, like a previous decision to the same effect by the late Mr. Justice Bailhache, draws a distinction between a deliberately criminal act and one which, though unlawful, is not done in circumstances in which it is manifestly unlawful or in which the person who does it knows it to be unlawful. The motorist was criminally negligent but he did not deliberately kill the Army officer. If Mr. Justice Roche had decided otherwise, the decision would have extended beyond the confines of motor-car insurance, and would have made itself felt in workmen's compensation insurance and elsewhere—for instance, where a workman was injured by an accident caused by a breach of the Factory Acts. The law, however, may be affected presently by fresh legislation compelling all motorists to insure against third party risks.

RECENT WORK ON CONVULSIONS.

THERE is at present no general agreement as to the precise part of the brain in which convulsions arise. W. E. Dandy and R. Elman [1] recently found that after injury of the pre-Rolandic cortex in dogs or cats, by incision or by inclusion of a foreign body, convulsions occurred for a time spontaneously, and for several months they could be induced with one-third to one-seventh of the dose of absinthe required to produce convulsions in the normal animal. In these experiments, all unilateral, the pre-Rolandic cortex was never completely destroyed but was only injured. The conclusions drawn from these experiments were: (1) that injury of the pre-Rolandic cortex lowers the threshold for convulsions; (2) tentatively, that injury to other parts of the brain lowers the threshold to a less degree. In a subsequent series of experiments Dandy [2] has studied the effects of removal of the pre-Rolandic cortex. He found that clonic convulsions could be produced at will by direct stimulation of this area in a dog under light anæsthesia; there was an optimal intensity of stimulation, a stimulus too light or too heavy producing only a single jerk of the corresponding part of the body. Deep etherisation inhibited clonic convulsions entirely; with a less deep etherisation the movements remained localised, and when the ether was still further reduced they quickly became generalised. Stimulation of all other parts of the surface of the cerebral hemispheres failed to produce a motor response except when rather powerful stimuli were used on the cortex or subcortex contiguous to the Rolandic area; stimulation of the cerebellum produced contractions but never clonic convulsions. A tunnel was made through the cortex posterior to the Rolandic area and the subcortical motor tracts were exposed just above the internal capsule; stimulation of these fibres, the motor cortex being intact and uninjured, produced clonic convulsions, local and general, seemingly just as effectively as stimulation of the pre-Rolandic cortex. Stimulation of the subcortex aside from the motor tracts did not produce a response. If during a localised clonic convulsion the motor cortex of the contralateral side was excised by a sweep of the knife, the convulsion instantly and completely ceased; if during a generalised clonic convulsion the motor cortex of both hemispheres was excised by two rapid sweeps of the knife the convulsion instantly ceased in all parts of the body. When, after excision of the pre-Rolandic cortex on one side the subcortical motor fibres were stimulated, a convulsion did not ever again result on the contralateral side of the body, but clonic convulsions might appear on the same side (the opposite pre-Rolandic cortex being intact). After excision of the pre-Rolandic cortex of both cerebral hemispheres, clonic convulsions could not again be induced in any part of the body with stimuli of any intensity applied to the subcortical motor fibres. Excision of the cerebellum had no effect on any of these results; stimulation of the cerebellum with the pre-Rolandic cortex either intact or removed from one or both sides failed to produce clonic convulsions.

These experiments seem to show that the pre-Rolandic cortex is essential for the development of clonic convulsions. Whether any other parts of the cortex are also essential remains to be examined. The cerebellum is apparently not essential and appears not to influence the occurrence or nature of clonic convulsions; the influence of other large cerebral structures is less easily determined, and in these experiments no attempt was made to investigate it. The part played by the pre-Rolandic cortex in the production of the convulsion is evidently not merely the sending of stimuli down the motor tracts, since in the absence of this portion of the cortex the sending of stimuli down the motor tracts does not produce a convulsion.

[1] Bull. Johns Hopkins Hosp., 1925, vol. xxxvi., No. 40.
[2] Jour. Amer. Med. Assoc., Jan. 8th, 1927.

THE STORY OF THE LUCIFER.

ANOTHER centenary which occurs this week is that of the humble friction match, for it was on April 7th, 1827 that John Walker recorded the first sale of the newly invented "friction light" at a shilling per hundred, with twopence extra for the tin case. Walker was born in Stockton-on-Tees in 1781, and he died there in 1857. For the greater part of his life he owned a pharmacist's shop in his native town, but it appears that as a youth he was apprenticed to a Mr. Watson Alcock, a surgeon in the town. After completing his apprenticeship, he went to London, presumably to complete his studies, returning to become Mr. Alcock's assistant. However, Walker could not stand the horrors of surgical operations and he soon abandoned his original profession, and after a suitable training he established himself as a pharmacist. It is a curious coincidence that two days before the first recorded sale of "friction lights" took place there was born a man who was responsible for stripping surgical operations of that horror which drove John Walker from the practice of surgery to the chemical laboratory, where the familiar match was born. In his student days Walker had shown great interest in chemical experiments and these, no doubt, led eventually to his discovery of the "friction light" as he called it. For many years, however, he was said to have made his "invention" by a lucky accident. Since he did not divulge the exact chemical composition of his matches—for he steadfastly refused to patent what might have brought him a considerable fortune—spurious imitations were to be obtained in London by about 1830, and the invention of the friction match has consequently been attributed to various other people at different times. Prof. William A. Bone has had access, however, to an old Day Book of Walker's and in a recent article[1] he offers an explanation of how the discovery was made of what was undoubtedly the first friction match. It appears from records in Walker's own writing that for some years he had been making Chancel's "oxymuriate matches" for some of his customers. These consisted of strips of wood tipped with a mixture of potassium chlorate, sugar, and gum, which were ignited by contact with strong sulphuric acid. As early as 1825, if not before, Walker was experimenting with the production of a "percussion powder" for use in sporting guns. This consisted of a mixture of equal parts of potassium chlorate and antimony sulphide, and it appears to have occurred to him to use a similar mixture for tipping the Chancel "dipping" match. Such "friction lights" were ignited by rubbing them on glass paper, a piece of which was supplied with each case. The first recorded credit sale was in 1827, as mentioned above, and by 1829 the fame of the "match," a term which Walker now used, had reached London, where Faraday is said to have exhibited some at a lecture. Except for the placing of a brass tablet on Walker's old shop in the High Street, Stockton-on-Tees, nothing has ever been done in this country to recognise or commemorate the discovery of what is now probably the most universal saver of time and trouble.

A NEW PARTIAL VACCINE AGAINST GONORRHŒA.

THE production of immunity to the gonococcus is not yet properly understood and is denied by some as a natural process in the cure of the disease. The discovery and trial of a new principle in the vaccine therapy of gonorrhœa is reported in a short preliminary paper in the *Journal of the Royal Army Medical Corps* for March, 1927, by Major E. C. Lambkin, Major Lyn Dimond, and Captain W. J. Robertson. The idea underlying their work was, they state, "to find a non-toxic gonococcal vaccine for use (*a*) intraurethrally as a local immunising agent as used by Besredka in other

[1] Nature, April 2nd, 1927, p. 495.

conditions, and (*b*) for general use to be applied intradermally, subcutaneously, intramuscularly, or intravenously." In order to achieve this the gonococcus was grown on special media, washed off and fractionated. When the germ is grown on a medium rich in animal nucleo-protein one-third of the strains develop polar (Babes-Ernest) bodies, composed of alpha-nucleo-protein and beta-nucleo-histone. A 2 per cent. salt solution, while dissolving the latter, is able to separate these polar bodies from the organisms and centrifuging allows the α-nucleo-protein to be separated from the β-nucleo-histone which is in solution by the saline. Both bodies possess antigenic properties, but the β-nucleo-histone is more potent than the other, besides being relatively non-toxic and therefore especially suitable for vaccine use. For intradermal, subcutaneous, intramuscular, or intravenous injections a strength is used which is the product of 1000 million gonococci per c.cm. in 2 per cent. saline, 0·2 c.cm. of this being injected every two days. For intraurethral injection a standard solution in 2 per cent. saline is made so that the nucleo-protein of 100,000 millions of organisms is contained in 15 c.cm. To this is added 1 per cent. of sodium taurocholate, the reaction adjusted to a pH of 7·2, and brought up to 100 c.cm. with mucin. The urethra is irrigated with a 1 in 20,000 solution of potassium permanganate and a dose of 20 c.cm. of the vaccine preparation is then injected and retained for three or four hours. This is repeated daily as long as gonococci are found in the discharge. As a test of cure endotoxin from strains not showing polar bodies is used. The results satisfy the authors, but fuller reports will be awaited with interest. The principle, it seems, is new and depends on the observation that the antigenic properties of the vaccine are confined to the polar bodies. The authors regard the pH content of the urine as a factor of importance and it might be worth while to inquire what are the results of weak permanganate with an optimum pH of urine but without vaccine. The difficulties of producing the vaccine in the quantities desired remain to be overcome but the principle, if substantiated, should be of wide application.

WITCHCRAFT AND MEDICINE.

"DRESS the wound with warm wine only, and lift no lancet against this young swordsman, for he was born under the Sign of Gemini, which is opposite in all things to the Sign of Sagittarius. Therefore the sight of pointed weapons induces in him a kind of madness, and he is very handy with a cutting edge himself." The speaker is an English man-at-arms who strides into a spirited mediæval romance by Mr. Leslie Barringer.[1] The mock-portentous conclusion to this piece of good advice reveals an age when common sense in treatment of wounds and injuries required metaphysical justification. Cupping and suppurative medicaments being thus discouraged, we are told that the hero's gashed thigh "had a better chance of healing than was given to many such wounds in those times." Mr. Barringer has brought his casual use of medicine and surgery into apt line with his period. The latter is apparently the middle of the fifteenth century; the scene of the story is an imaginary European kingdom with a Breton flavour about its coast-line, but a frontispiece map removes the Ruritanian difficulty usual in fiction of this kind. The action is well-sustained, and the love-interest inevitable on popular grounds, but the book is remarkable for its treatment of the theme of witchcraft. The publisher's announcement promises "witches most foul," but the hero—a runaway and a minor when the main action opens—blunders into knowledge of the witches which sets the latter in at least as favourable a light as his relatives and peers amongst the almost sovereign barons of the country. Briefly, witchcraft is here visualised not as a form of heresy, but as a survival of heathendom—a debased Dianic cult driven into the hills and waste places, but deeply rooted in the peasantry (*pagani* indeed), and affording by its manifestation some relief from the appalling social weight at the base of the feudal pyramid. We are reminded of the words of Michelet in *La Sorcière*: "the mediæval peasant would have burst, but for his hope in the Devil." No clear picture is shown of ritual or operative magic, but the suggestion seems to be that the power of the witches rested ultimately upon drugs. Members of a coven are seen riding on horseback to their assembly; discovery of a secret stair dispels a suspicion of levitation; a too-confiding witch employs ventriloquism to re-establish awe in her companion. Naturalistic explanation is not, however, overdone, and the darker features of the cult are not ignored. Incidentally, the one potion used to further the action is a pharmaceutical failure; an aphrodisiac is administered, but circumstances are unfavourable, and the end-result is homicide. This is a good romance, which may be recommended not only to novel readers, but to students of that age when medicine and mysticism were inextricably mixed.

[1] Gerfalcon. By Mr. Leslie Barringer. London: William Heinemann, Ltd. 1927. Pp. 310. 7*s.* 6*d.*

FORM AND FUNCTION.

PARENTS, school-masters, and school-mistresses must often feel proud of the lusty young things which grow up nowadays under their guidance. The well-being of the baby is measured by the balance, which even in its most domestic form is, at any rate, a more objective criterion than nurse's prejudiced eulogy. In later years children are weighed and measured as they pass through their school terms, and finally there are produced the big, handsome, wholesome-looking young people of 20 and thereabouts who have become almost commonplace. No one can doubt that there has been a general increase in size; school-boys of over 6 feet and weighing 12 stone or more seem quite common now, and the change in school-girls is perhaps even more striking. A recent number of the *Journal of the American Medical Association* (March 19th, 1927, p. 908) gives some data for American boys, showing that they are taller by fully 2 inches than were comparable boys 50 years ago. Nor will anyone doubt that this change is due to hygienic betterment and especially to the more ample diet, caloric and vitaminic, to which so much attention is now paid. The result is artistically beautiful and must be cheering to the dietitians. But is it wholly for the good? Is there any evidence that larger people are even healthier than their more stunted companions? And in a field less open to quantitative measurement, is there any evidence that they will make better citizens—physically, mentally, and morally? The answers to these questions, if they can ever be had, must wait the experience of the future. Meanwhile data are obtained which increase one's misgivings. The experiments of Drs. J. E. Anderson and A. H. Smith[1] have achieved some notoriety in the lay press. They show that rats which are so underfed that they do not increase in weight can learn their way through a maze more quickly than normally fed and normally growing controls, and can relearn an old puzzle more quickly, too, after a period of abstention from experience of it. When the stunted animals were fed up and reached the weight proper for their age they were no cleverer than their companions. Such results are much more than amusing, for they bring within the range of tolerably accurate experimentation that conflict between body and mind which has been perceived by many thoughtful people since man reached the stage of civilisation at which he could sometimes eat less than he could get. A certain amount of restraint and parsimony are seldom out of place. It is possible that "this feeding business" is being overdone, and that tissues which have grown rather less exuberantly may perform their offices more satisfactorily.

[1] Jour. Comp. Psychol., 1926, vi., 337.

CONTROL OF TUBERCULOSIS IN U.S.A.

IN an address recently given to the New York Tuberculosis and Health Association Mr. Godias J. Drolet, statistician to the Association, provides some interesting statistics of tuberculosis in the United States. From a table giving the numbers of cases of tuberculosis and of deaths from tuberculosis reported in 1924 in 23 States and 11 cities, it is evident that, as in most countries, case-notification is very incomplete; thus in the State of Washington the number of cases notified is practically the same as the number of deaths registered—viz., 2202 cases and 2183 deaths. In Rhode Island the deaths were more numerous than the reported cases. A useful table is that giving the populations, deaths from tuberculosis, and beds available for tuberculosis in each State. In the whole of the States there were, in 1924, 99,579 deaths from tuberculosis and 73,715 beds available. Another table summarises the reported results of sanatorium treatment obtained in answer to a questionnaire. Information concerning condition on discharge was obtained from institutions disposing of 31,581 beds; of these discharges, 20 per cent. represented deaths, 23 per cent. condition unimproved, 42 per cent. condition quiescent or improved, 15 per cent. disease arrested. With regard to utilisation of facilities, 221 institutions with 38,726 beds reported on July 1st, 1926, that 32,529 patients were under treatment, a user of 84 per cent. The range of weekly cost of maintenance is very wide; it varies in New York State from 10 to 39 dollars, in California from 15 to 41 dollars, in New Jersey from 10 to 28 dollars. More than 40 per cent. of all patients remain in a sanatorium or hospital less than three months, and only 10 per cent. of those admitted were classified as in the incipient stage of the disease.

NEW METHODS OF TREATING BOILS AND COLD ABSCESSES.

THERE has been a wide awakening of interest of late in what is called protein shock therapy, the mechanism of which is the stimulation of bodily resistance by means of an injection of foreign protein. For some time it has been almost impossible to open a medical journal without finding some reference to the results obtainable in various local infective conditions by injecting milk, albumin, or a vaccine of some kind or other. To the scientific mind there is something unsatisfactory about irritating the whole body with a foreign substance in the hope of securing reaction in one or two centres of infection but without knowing what is happening or why. Dr. Franz Kuhn's latest paper [1] on the treatment of boils deals with an injection process that acts directly on the focus of infection, and produces an immune reaction throughout the whole cellular structure of the inflamed tissue, the substance employed being the patient's own blood. The cupping of boils is no new thing, but, according to Dr. Kuhn, unless capillary hæmorrhage is produced throughout the whole of the inflamed tissue much of the healing power of the healthy blood is lost. Bier's apparatus, he says, with a lift of at most 50–100 mm. Hg, does not break the capillaries; it only draws into the boil what would filter through their walls. Success has been claimed for the injection of the patient's blood around the boil with a needle, but at best the effect is momentary and, in most cases the operation, in Dr. Kuhn's opinion, is useless. His technique is described in an earlier number of the same journal.[2] He employs a vacuum powerful enough to induce extensive capillary hæmorrhage, followed by an energetic use of hot packs to promote hyperæmia, and he claims that some boils need only one application of this treatment.

In the *Presse Médicale* for March 19th Prof. H. L. Rocher, of Bordeaux, claims excellent results, in cases of cold abscess where no fistula has developed, from lavage with water at 60° C. (140° F.). He recommends it chiefly for *abcès ganglionnaires*, and articular and bone abscesses, especially those which occur in Pott's disease and in coxalgia. Moreover, when the epidermis is on the point of rupturing, this treatment will often prevent a break by thickening and toughening the remaining layers. One of its principal advantages is the rapidity with which it takes effect. The water is boiled for ten minutes and allowed to cool to 140° F., where it is maintained. Hayem's serum may, it is suggested, advantageously be used instead of water. The needle or trocar used must be large enough to allow of easy aspiration. First of all the collection of pus is withdrawn and then the abscess cavity is well laved with the hot fluid. The caseous detritus on the pyogenic membrane is speedily broken up and carried away through the syringe at each aspiration, and by the end of the lavage the membrane is generally bleeding. If the evacuated fluid is pink only the process may be continued for another three to five minutes, but if it is red the operation should cease. All water should be withdrawn and, if the puncture is so large as to cause anxiety lest a fistula develop, a small poultice should be applied for 48 hours. Prof. Rocher admits that the treatment is somewhat painful, but not beyond the endurance of the ordinary adolescent or adult; he does not mention what anæsthetic he uses for children. The process has generally to be repeated a certain number of times before the abscess is entirely dry, but some collections, even large ones, disappear after one lavage. The method, he claims, gives better results than the injection of modifying liquids, and its simplicity should appeal to the practitioner.

[1] Münchener Med. Woch., 1927, i., 451, Schnellheilung des Furunkels.
[2] Ibid., 1926, No. 31.

THE LATE DR. F. B. POWER.

Frederick Belding Power, Ph.D., LL.D., who died of heart failure on March 30th at Washington, U.S.A., at the age of 74 years, was an American by birth and upbringing, who spent the most fruitful period of his life in this country, where he was Director of the Wellcome Chemical Research Laboratories from their foundation in 1896 until 1914, when he returned to America to direct the Phytochemical Laboratory at Washington. Born at Hudson, New York, Dr. Power commenced his association with pharmacy at an early age. He worked as a practical pharmacist in Chicago and Philadelphia, where he was associated with Edward Parrish, of "compound syrup of phosphates" fame. He graduated in pharmacy at Philadelphia and again at Strasbourg, where he acted as assistant to Prof. Flueckiger. In 1881 he was called to the chair of analytical chemistry at the Philadelphia College of Pharmacy, and two years later he established the school of pharmacy at the University of Wisconsin. In 1896, at the invitation of Mr. Henry S. Wellcome, his old class-mate at the Philadelphia College, Dr. Power came to England to direct the new Wellcome Laboratories and became responsible for the 168 scientific papers issued from the Laboratories communicated to learned societies during his tenure of office. One of his most important investigations was into the active constituents of chaulmoogra and hydnocarpus seeds in the modern treatment of leprosy. The value of his work was recognised in the conferment of numerous honours; in 1908 the University of Wisconsin granted him the honorary degree of Doctor of Laws, and in 1913 he was awarded the Hanbury Gold Medal. He was Vice-President of the Society of Chemical Industry from 1904–06, served on the council and publications committee of this society, and was awarded the Ebert Prize on three occasions. After his return to America he served on the committee of the United States Pharmacopœia, and in 1920 was elected Vice-President of the United States Convention. One of the last honours that was bestowed on him was his appointment as a member of the National Research Council on the Committee of Federal Relations. His death removes a figure of international influence in pharmaceutical and phytochemical research.

THE BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.

WE publish in another column an importantly-signed letter bringing before our readers the objects of the British Institute of Philosophical Studies, and indicating clearly how useful such studies might prove themselves to medical men both in general and special fields. Lord Dawson and his co-signatories suggest that the modern developments of medical science bring with them difficulties to medical men because the range of exact knowledge and accomplishment is much enlarged, and evaluations have become in every medical direction more hard to make; and also because medicine is now taking its place in a marked manner in general matters, while society at large is an increasingly complicated affair. The followers of medicine are therefore required to think logically, not only on questions concerning their own science or dealing with the administration of their own calling, but to think with equal insight and equal clearness upon the part that they should play as general citizens for the common good, particularly, as when happens so frequently, the medical side of the question is of the chief public importance. The particular training of medicine provides both well and ill for the clear thinking that is necessary in all these situations. Much of medicine must be in itself a profound philosophical study, but it may easily happen that what may appear to the followers of medicine as the logical view will be in apparent antagonism to what is called common sense—not necessarily good sense. Now the Institute proposes to help its members to arrive at sound conclusions in these situations, which may present themselves either as the necessary accompaniment or complication of practice, or as problems in general sociology. As the letter to which we refer points out, the position must often arise when the medical practitioner feels the need of that comprehensiveness of vision which would come from taking counsel with those engaged on other pursuits. The British Institute of Philosophical Studies proposes to afford opportunity for just such coöperation.

LUMINOUS BACTERIA.

THE phosphorescent bacteria which are common in many marine products have been well known for many years; a stale herring in a dark room will often give a remarkable demonstration. Why the bacteria should do it is even more a mystery than is the emission of similar light by the various higher animals which are capable of luminosity. Some years ago Prof. E. N. Harvey of Princeton University collected the available information in handy form.[1] It now appears that the light-giving capacities of bacteria have been utilised in different ways by other organisms. Some cuttle fish have a highly organised luminous organ furnished with a pigment layer at the back and a lens in front not unlike an eye; inside is a mass of glandular tissue from which the light proceeds and Pierantoni has claimed that the light actually comes from great numbers of bacteria which live symbiotically in the cells of the host. His evidence is not altogether conclusive, but it is substantially in favour of his view. More recently Yasaki has described [2] a curious case in Japan where certain fresh-water shrimps are infected with a vibrio-like organism and become in consequence brightly luminous. In this instance the relation is one of infection rather than of symbiosis, for the bacilli are pathogenic and kill the shrimps within a few hours of their becoming luminous. Other species of shrimps may be infected experimentally.

A DEPARTMENT for the treatment of diseases of the skin has for many years been developing at the General Infirmary at Leeds. When assistant physicians were first appointed in 1884, an arrangement was made whereby the skin cases were seen by one of the officers along with his other cases. Then, some 28 years ago, the increase of the work led to the skin cases being segregated and seen on a separate day, but still by one of the assistant physicians. Under this plan the number of patients increased, for, in some respects, it marked the existence of a special department and it was conducive to better teaching. When cases were admitted to the wards, however, they were placed under the care of the physician of the week. Acting under the advice of the honorary staff, the board of the infirmary have now decided to appoint a special honorary officer and to place him in charge of a reorganised department. Here he will have excellent facilities for out-patient practice; ten beds will be allotted to his department at first, but there may well be a chance of further expansion.

FROM Oct. 1st the monetary value of all the Beit Memorial Fellowships for Medical Research will be increased. The junior Fellowships will in future carry a grant of £400 a year instead of £350, whilst the fourth year Fellowships will be valued at £500 instead of £400, and the senior Fellowships at £700 instead of £600. The next election of junior Fellows will be held in July, and the Fellows then elected will be expected to begin work on Oct. 1st. The usual tenure of junior Fellowships is three years. Applications must be made before June 1st, and further information may be had from Sir James K. Fowler at 35, Clarges-street, London, W. 1.

IN view of a statement made in a leading article on March 12th, on the potency of ovarian extract now on the market, we would draw our readers' attention to our column on Analytical Records (p. 764).

Summer Time will commence in Great Britain, Ireland, the Channel Islands, and the Isle of Man next Sunday morning, April 10th, at 2 A.M., when the hands of timepieces should be advanced one hour.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions

CCXVIII.

TREATMENT OF THE FUNCTIONAL DYSPEPSIAS.

PURELY functional dyspepsia is probably less common than is supposed, and before treating a case as such it is well first to eliminate by thorough investigation all possibility of organic disease within the abdomen. For this purpose a careful and detailed clinical history is more important than any other method of investigation. If this shows that real *pain* (as opposed to mere discomfort) or vomiting or wasting has been a prominent symptom it is almost certain that organic disease is present, although the absence of these does not necessarily mean that the case is functional. The organic conditions chiefly to be thought of are carcinoma, gastric or duodenal ulcer, gall-stones and chronic appendicitis. Early carcinoma is, of all organic conditions, the most difficult to exclude. The most suspicious symptoms of it are loss of appetite and wasting, along with some gastric discomfort, and if these come on in a man of middle age who has previously had a good digestion, carcinoma should be thought of. In ulcer cases pain is always present and is characteristically "punctual," appearing at a definite time after meals and, especially in duodenal cases, being temporarily relieved by the taking of more food. In ulcer, too, the symptoms

[1] Monographs on Experimental Biology: The Nature of Animal Light. J. B. Lippincott Co. 1920. 10s. 6d.
[2] Jour. Infect. Dis., 1927, xl., 404.

occur in attacks with relatively long periods of good digestion between. The absence of vomiting and hæmatemesis are of no importance in the diagnosis. In gall-bladder dyspepsia pain is present but is "unpunctual," and flatulence or a feeling of "distension" are prominent symptoms. The patient is usually a stoutish married woman of middle age. Appendix dyspepsia can only be diagnosed with certainty by the results of exploration.

Diagnostic Aids.

Accessory diagnostic aids are furnished by test-meals and X ray examination. The test-meal, rarely decisive in ordinary practice, can usually be dispensed with. In gall-bladder and appendix cases and in chronic gastric ulcer it is of little help; in chronic duodenal ulcer a high curve is very constant and its absence should throw doubt on the diagnosis; in carcinoma low acidity is the rule but, and especially in an early case, the presence of even free HCl does not negative the possibility of cancer. Chronic gastritis is perhaps the only organic condition which can be detected by a test-meal alone (excess of mucus). It is, however, comparatively rare and is certainly too often diagnosed. Its treatment does not concern us here.

X ray examination, especially if it is done by an expert, is of far greater value than the test-meal. A negative result, however, should not be allowed too much weight if the clinical history points the other way. It is of most help in the detection of *chronic* ulcers and of carcinoma, but in the earliest stages of the latter even X rays may fail to reveal the disease, and the only method of making a diagnosis early enough to give operation a chance is by exploration. Doctors should have the moral courage to insist upon this if the symptoms are suggestive and do not disappear after a month's treatment on functional lines.

Visceroptosis is, in women, the cause of much difficulty in diagnosis, as its symptoms may sometimes simulate those of organic disease, real pain, and even vomiting, being occasionally caused by it. If radiographic investigation fails to show organic disease, and if the symptoms persist after treatment for the visceroptosis on the usual lines, it may be necessary to resort to exploration.

Two Great Groups.

Organic disease having been eliminated, the functional cases may be divided for purposes of treatment into two great groups: (1) the hypersthenic (hypertonic); (2) the asthenic (atonic).

The hypersthenic cases are commoner in men and are characterised by increase of gastric tone, a tendency to pyloric spasm, and superacidity of the contents. The asthenic cases are met with chiefly in women, are frequently associated with the presence of gastroptosis and show diminution of tone and motility, and often, though by no means always, subacidity of contents. The chief symptoms in the hypersthenic cases are "acidity" and hunger-discomfort; in the asthenic group, flatulence, "slow digestion," and a "sinking" sensation when the stomach is empty.

In both groups there is a nervous basis. In the hypersthenic, nervous irritability and exaggerated reflex excitability; in the asthenic, nervous exhaustion and depression. The recognition of the underlying nervous factor is of great importance for it means that *treatment must first be directed to the nervous system.* This involves an inquiry into the patient's whole mode of life with the object of getting rid, so far as possible, of all causes of physical, mental, and emotional strain. Sometimes it is advisable to send the patient away for a holiday, choosing a bracing inland place for the asthenics and a more sedative one for the hypersthenics. In the more severe cases of the asthenic type complete rest in bed may be required, along perhaps with abdominal massage and other forms of physical treatment. Even in the milder cases rest in the recumbent position for a short time before and after meals is of great value. In the abolition of emotional causes of exhaustion psychotherapy is often of help. In all cases, whether hypersthenic or asthenic, regular meals, well cooked, attractively served, and preferably eaten in company should be insisted upon, but the wholesale extraction of teeth in functional dyspepsia—still too often done—is strongly to be deprecated. The dietetic and medicinal treatment in the two groups may be considered separately.

Hypersthenic Type.

(*a*) *Diet.*—In this type the diet must be planned to meet the excess of acidity. There are two views as to how this may best be done. Some believe in giving foods which "fix" the free acid by combining with it and so rendering it harmless. Proteins do this, and so the supporters of this line of treatment allow meat and other animal foods freely. Others take the view that the protein foods stimulate the production of gastric juice, and so confine the diet largely to carbohydrates. I am an adherent of the first view, and allow meat and other animal foods, but limit starches and sugars. Fats are given freely, seeing that they tend to restrain secretion; but all direct stimulants of secretion should be forbidden, chief of these being salt, spices, pickles, and the extractives contained in soups and gravies. Alcohol is also a stimulant of secretion. Sour things should naturally be interdicted where the acidity is high, and tea (except China) comes under the same ban because of its tannic acid.

(*b*) *Drugs.*—The drugs useful in this type are those which restrain secretion and relax spasm, those which neutralise secretion, and those which are nerve sedatives. Belladonna acts in the first of these ways and may be given in 10 or 15 drop doses in water before breakfast or in a smaller dose before each meal. The best antacids are the carbonates of bismuth and magnesia or magnesium oxide, and these may be given in full doses about two hours after meals. If the magnesia causes diarrhœa some calcium carbonate may be substituted for it. Sometimes it is more convenient for the patient to carry the antacid in the form of a lozenge (troch. bismuth co., absorbent lozenges, &c.).

The bromides are the best nerve sedatives, and may be given along with the antacid in such doses as are indicated.

The Asthenic Type.

(*a*) *Diet.*—The diet in this type should be arranged not with a view to the state of the gastric secretion, but in order to suit the impaired motor power. Meals should therefore be small, frequent, and dry, for a large meal and the weight of fluid tend to over-distend an atonic stomach. Bulky foods such as vegetables (with a few exceptions like spinach, asparagus, and the white part of cauliflower) should be avoided, and so should raw fruits. Crisp toast and rusks should be substituted for bread, and potatoes taken sparingly, and only if mashed. Articles which stimulate secretion (condiments, &c.) are now of use, and alcohol in not too dilute a form may often be taken with advantage at meals.

(*b*) *Drugs.*—These are of use to stimulate secretion and increase tone, and a mixture of small doses of a soluble alkali (sod. bicarb., gr. v.) with nux vomica and a bitter infusion before meals meets most indications. The exhibition of acids after meals and of "ferments" of any kind is rarely called for. In overcoming constipation, which is often present, the more tonic aperients (aloe, cascara, rhubarb, and senna) should be chosen.

ROBERT HUTCHISON, M.D. Edin., F.R.C.P. Lond.,
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CHURCH OF SCOTLAND DEACONESS HOSPITAL.—The annual cost per bed in this Edinburgh Hospital has increased from £43 in 1914 to £129. Hitherto the institution has paid its way, but last year there was a small adverse balance.

THE LISTER CENTENARY.

FIRST DECLARATION OF THE ANTISEPTIC SYSTEM.

THE first actual revelations of the clinical outcome of the antiseptic doctrines were contained in a series of articles which commenced their course in THE LANCET of March 16th, 1867. Lister's conclusions were based on a series of cases, which, like the one that follows, illustrated for all who could follow his argument the profound revolution which he was inaugurating by bringing the treatment of compound fractures into a position where results hitherto undreamt of could be obtained.

ON A NEW METHOD OF TREATING COMPOUND FRACTURE, ABSCESS, ETC.,

WITH OBSERVATIONS ON THE CONDITIONS OF SUPPURATION.

BY JOSEPH LISTER, ESQ., F.R.S.,
PROFESSOR OF SURGERY IN THE UNIVERSITY OF GLASGOW.

THE frequency of disastrous consequences in compound fracture, contrasted with the complete immunity from danger to life or limb in simple fracture, is one of the most striking as well as melancholy facts in surgical practice.

If we inquire how it is that an external wound communicating with the seat of fracture leads to such grave results, we cannot but conclude that it is by inducing, through access of the atmosphere, decomposition of the blood which is effused in greater or less amount around the fragments and among the interstices of the tissues, and, losing by putrefaction its natural bland character, and assuming the properties of an acrid irritant, occasions both local and general disturbance.

We know that blood kept exposed to the air at the temperature of the body, in a vessel of glass or other material chemically inert, soon decomposes; and there is no reason to suppose that the living tissues surrounding a mass of extravasated blood could preserve it from being affected in a similar manner by the atmosphere. On the contrary, it may be ascertained as a matter of observation that, in a compound fracture, twenty-four hours after the accident the coloured serum which oozes from the wound is already distinctly tainted with the odour of decomposition, and during the next two or three days, before suppuration has set in, the smell of the effused fluids becomes more and more offensive.

This state of things is enough to account for all the bad consequences of the injury.

The pernicious influence of decomposing animal matter upon the tissues has probably been underrated, in consequence of the healthy state in which granulating sores remain in spite of a very offensive condition of their discharges. To argue from this, however, that fetid material would be innocuous in a recent wound would be to make a great mistake. The granulations being composed of an imperfect form of tissue, insensible and indisposed to absorption, but with remarkably active cell-development, and perpetually renovated as fast as it is destroyed at the surface, form a most admirable protective layer, or living plaster. But before a raw surface has granulated, an acrid discharge acts with unrestrained effect upon it, exciting the sensory nerves, and causing through them both local inflammation and general fever, and also producing by its caustic action a greater or less extent of sloughs, which must be thrown off by a corresponding suppuration, while there is at the same time a risk of absorption of the poisonous fluids into the circulation.

This view of the cause of the mischief in compound fracture is strikingly corroborated by cases in which the external wound is very small. Here, if the coagulum at the orifice is allowed to dry and form a crust, as was advised by John Hunter,[1] all bad consequences are probably averted, and, the air being excluded, the blood beneath becomes organised and absorbed, exactly as in a simple fracture. But if any accidental circumstance interferes with the satisfactory formation of the scab, the smallness of the wound, instead of being an advantage, is apt to prove injurious, because, while decomposition is permitted, the due escape of foul discharges is prevented. Indeed, so impressed are some surgeons with the evil which may result from this latter cause, that, deviating from the excellent Hunterian practice they enlarge the orifice with the knife in the first instance and apply fomentations, in order to mitigate the suppuration which they render inevitable.

Turning now to the question how the atmosphere produces decomposition of organic substances, we find that a flood of light has been thrown upon this most important subject by the philosophic researches of M. Pasteur, who has demonstrated by thoroughly convincing evidence that it is not to its oxygen or to any of its gaseous constituents that the air owes this property, but to minute particles suspended in it, which are the germs of various low forms of life, long since revealed by the microscope, and regarded merely accidental concomitants of putrescence, but now shown by Pasteur to be its essential cause, resolving the complex organic compounds into substances of simpler chemical constitution, just as the yeast-plant converts sugar into alcohol and carbonic acid.

A beautiful illustration of this doctrine seems to me to be presented in surgery by pneumothorax with emphysema, resulting from puncture of the lung by a fractured rib. Here, though atmospheric air is perpetually introduced into the pleura in great abundance, no inflammatory disturbance supervenes; whereas an external wound penetrating the chest, if it remains open, infallibly causes dangerous suppurative pleurisy. In the latter case the blood and serum poured out into the pleural cavity, as an immediate consequence of the injury, are decomposed by the germs that enter with the air, and then operate as a powerful irritant upon the serous membrane. But in case of puncture of the lung without external wound, the atmospheric gases are filtered of the causes of decomposition before they enter the pleura, by passing through the bronchial tubes, which, by their small size, their tortuous course, their mucous secretion, and ciliated epithelial lining, seem to be specially designed to arrest all solid particles in the air inhaled. Consequently the effused fluids retain their original characters unimpaired, and are speedily absorbed by the unirritated pleura.

Applying these principles to the treatment of compound fracture, bearing in mind that it is from the

[1] See Works of J. Hunter, edited by Palmer, vol. i., p. 429.

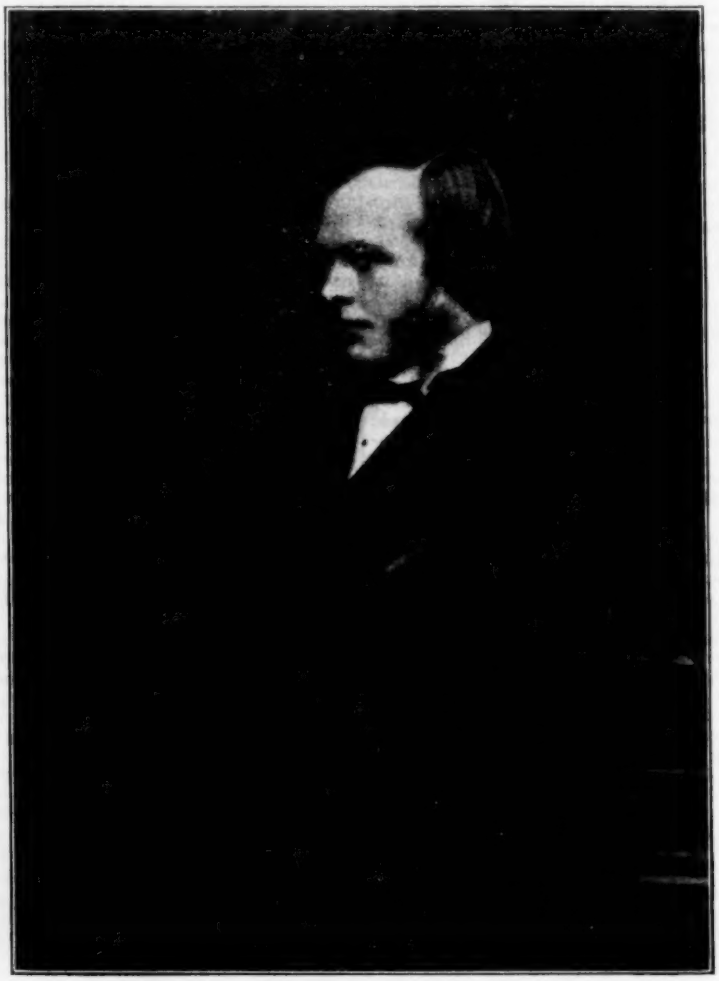
vitality of the atmospheric particles that all the mischief arises, it appears that all that is requisite is to dress the wound with some material capable of killing these septic germs, provided that any substance can be found reliable for this purpose, yet not too potent as a caustic.

In the course of the year 1864 I was much struck with an account of the remarkable effects produced by carbolic acid upon the sewage of the town of Carlisle, the admixture of a very small proportion not only preventing all odour from the lands irrigated with the refuse material, but, as it was stated, destroying the entozoa which usually infest cattle fed upon such pastures.

My attention having for several years been much directed to the subject of suppuration, more especially in its relation to decomposition, I saw that such a powerful antiseptic was peculiarly adapted for experiments with a view to elucidating that subject, and while I was engaged in the investigation the applicability of carbolic acid for the treatment of compound fracture naturally occurred to me.

My first attempt of this kind was made in the Glasgow Royal Infirmary in March, 1865, in a case of compound fracture of the leg. It proved unsuccessful, in consequence, as I now believe, of improper management; but subsequent trials have more than realised my most sanguine anticipations.

Carbolic acid[2] proved in various ways well adapted for the purpose. It exercises a local sedative influence upon the sensory nerves; and hence is not only almost painless in its immediate action on a raw surface, but speedily renders a wound previously painful entirely free from uneasiness. When employed in compound fracture its caustic properties are mitigated so as to be unobjectionable by admixture with the blood, with which it forms a tenacious mass that hardens into a dense crust, which long retains its antiseptic virtue, and has also other advantages, as will appear from the following cases, which I will relate in the order of their occurrence, premising that as the treatment has been gradually improved, the earlier ones are not to be taken as patterns.



JOSEPH LISTER.

A photograph taken at Glasgow in 1868.

CASE 1.—James G——, aged 11 years, was admitted into the Glasgow Royal Infirmary on August 12th, 1865, with compound fracture of the left leg, caused by the wheel of an empty cart passing over the limb a little below its middle. The wound, which was about an inch and a half long, and three-quarters of an inch broad, was close to, but not exactly over, the line of fracture of the tibia. A probe, however, could be passed beneath the integument over the seat of fracture and for some inches beyond it. Very little blood had been extravasated into the tissues.

My house surgeon, Dr. Macfee, acting under my instructions, laid a piece of lint dipped in liquid carbolic acid upon the wound, and applied lateral pasteboard splints padded with cotton-wool, the limb resting on its outer side, with the knee bent. It was left undisturbed for four days, when, the boy complaining of some uneasiness, I removed the inner splint and examined the wound. It showed no signs of suppuration, but the skin in its immediate vicinity had a slight blush of redness. I now dressed the sore with lint soaked with water having a small proportion of carbolic acid diffused through it; and this was continued for five days, during which the uneasiness and the redness of the skin disappeared, the sore meanwhile furnishing no pus, although some superficial sloughs caused by the acid were separating. But the epidermis being excoriated by this dressing, I substituted for it a solution of one part of carbolic acid in from ten to twenty parts of olive oil, which was used for four days, during which a small amount

[2] Carbolic acid is found in the shops in two forms—the glacial or crystalline, solid at ordinary temperatures of the atmosphere; and the fluid, which sometimes passes under the name of German creasote. The fluid variety is sold in various degrees of purity. The crude forms are objectionable from their offensive odour; but the properly rectified product is almost fragrant. Different samples, however, differ much in energy of action, and hence, though I have hitherto employed the liquid kind in compound fracture, it would probably be better to use the crystallised form, melting it by placing the vessel containing it in warm water for a few minutes. Carbolic acid is almost absolutely insoluble in water, but dissolves readily in various organic liquids, such as the common fixed oils or glycerine.

of imperfect pus was produced from the surface of the sore, but not a drop appeared from beneath the skin. It was now clear that there was no longer any danger of deep-seated suppuration, and simple water-dressing was employed. Cicatrisation proceeded just as in an ordinary granulating sore. At the expiration of six weeks I examined the condition of the bones, and, finding them firmly united, discarded the splints: and two days later the sore was entirely healed, so that the cure could not be said to have been at all retarded by the circumstance of the fracture being compound.

This, no doubt, was a favourable case, and might have done well under ordinary treatment. But the remarkable retardation of suppuration, and the immediate conversion of the compound fracture into a simple fracture with a superficial sore, were most encouraging facts.

MEMORIES OF A HOUSE SURGEON.*

BY SIR STCLAIR THOMSON,

PAST PRESIDENT, ROYAL SOCIETY OF MEDICINE.

"DURING the siege of Paris (1870-71) Nélaton, in despair at the sight of the death of almost every patient after operation, declared that he who should conquer purulent infection would deserve a statue made of gold." This passage occurs in the "Life of Pasteur." One hundred years ago to-morrow, April 5th, 1827, Joseph Lister was born, the man through whose work surgical purulent infection was conquered for all humanity and for all time. There is an indifferent and somewhat neglected bust of him in Portland-place, but the statue of gold has not yet been erected, although wound infection was conquered in Lister's own lifetime. Lister achieved more for mankind than all the surgeons from the beginning of history. Before his coming the results of surgical wounds were hardly better than in the dark ages and yet he lived to see his work and teaching result in the saving of more lives than all the military heroes of all the ages have destroyed.

Lister, a simple and a noble man, could never have understood the spirit of the poet who exclaimed: "Let fame which all hunt after be written on our tombs." If, indeed, Lister ever had hankered after posthumous fame, it would probably have been the words of Byron he would have quoted: "My epitaph shall be my name alone."

One hundred years ago to-morrow Lister was born. Fifty years ago, this year, he left Edinburgh for London. He was then 50 years of age. On the same day that he entered King's College Hospital as one of its surgeons, I entered it as a student—half a century ago. I came under the potent power of his personality. I am poorly prepared to speak of him as a scientific surgeon, and of the miracle he wrought in the history of human suffering. These matters will be dealt with by distinguished exponents during this week of Centenary Celebration. But he exerted on those who came into personal contact with him an influence, a devotion, and an elevation of thought that had in it a touch of inspiration.

Lister was of pure English stock. No one from Scotland, Ireland, or Wales can claim to see a Celtic fringe to the warp and woof of his nature. His people came from Yorkshire. His father was a prosperous wine merchant in the City of London, from whom he inherited other things besides a competence. Amongst these was a taste for scientific pursuits. The wine merchant was deeply interested in the science of optics; he helped to perfect the microscope, and was a Fellow of the Royal Society.

The house where Lister was born and passed his boyhood, Upton Lodge, was in his days quite in the country, in the county of Essex, some ten miles from London, and was surrounded, 100 years ago, with its 69 acres of fields and gardens. It is a charming, substantial, and commodious Queen Anne mansion: it still exists as an oasis beyond the desolation of mean streets which have joined the East-End of the City of London to the borough of West Ham. Refinement and culture still dwell there, for Upton Lodge is now the vicarage of St. Peter's parish, and our Society is delighted to welcome the vicar, the Rev. A. J. Parry.

After attending private schools in Hitchin and Tottenham, Lister entered University College, London, in 1844, at the age of 17. In University College Hospital he was present at the first operation performed in this country under ether, by Liston, on Dec. 21st, 1846. As chill penury did not repress his anxiety to see and know the best in the surgical world, he journeyed in 1853, at the age of 26, to Edinburgh, so as to study under Syme. This great surgeon—to whose memory and teaching Lister always remained devotedly attached—was a man of whom it was said that he never wasted a word, nor a drop of ink, nor a drop of blood. I need hardly say that this thrifty man was a Scotsman! Lister became his assistant, and, a few years later, his son-in-law.

From Edinburgh, Lister, at the early age of 33, was called to fill the Chair of Surgery in the University of Glasgow (1861). There he remained until 1869, and it was chiefly during these years that he laid the foundations of antiseptic surgery.[1] In 1869, at the age of 42, he returned to Edinburgh as Professor of Surgery in the University, and there he passed the eight years of his life which he afterwards referred to as the happiest, as they certainly were the fullest and most flowing.

In 1877, exactly 50 years ago, Lister was invited to London. Why did he come south? It was not to hunt for honours and distinctions; his Quaker character thought little of such adornments. It was not due to any mercenary attraction. He was the possessor of a sufficient private fortune, and the commercial side of our profession had no attraction for him. In Edinburgh Lister had many friends; his early years there, his Scotch wife, and his position in the University all were powerful to retain him in the Athens of the north and prevent him from migrating south. But, although Edinburgh students were radiating from the north, imbued with his principles, and although wise men from afar came there and carried to distant lands the glad tidings of great joy, yet still, and for many years afterwards, these principles were inadequately appreciated, were not generally admitted, and consequently their application was still imperfectly carried out. All who knew him are convinced that he accepted the invitation to London simply and solely because he felt that on the larger and more central stage of the metropolis he could so demonstrate his work that he would the sooner fulfil his mission and win the whole world to accept his principles. As his biographer records, "the antiseptic doctrine had been accepted in every part of the world that counted except London, where alone it made but little way." In taking leave of his class in Edinburgh he announced that it was only sense of duty which impelled him to leave a school where he had received great kindness, and to take a cold plunge into what he said "might prove to be a sea of troubles."

He was indeed right; a cold and stormy sea of trouble was awaiting him in London 50 years ago. Lister returned from his professorships in two Scottish Universities to his own southern people, to the city of his birth, and the country of his own form of faith. He returned to his own and his own received him not. Many peoples, in all times, have been addicted to stoning their prophets. England and London, half a century ago, were not backward in demonstrating

* Address delivered before the Royal Society of Medicine on April 4th.

[1] THE LANCET, 1867, I., 326. In this paper, Lister, after quoting Hunter's observations on healing under a crust, makes his first published references to the researches of Pasteur and to the use of carbolic acid.

that a prophet was not without honour except in his own country. His first function was the introductory address of the session on Monday, Oct. 1st, 1877—50 years ago—the first medical lecture I ever attended. The lecture theatre was crowded, and he had a cordial reception from former pupils, distinguished men of science, and many surgeons. But Lister, to most people's astonishment, opened his address by stating that he was going to record some experiments he had made "to obtain some positive and definite knowledge of the essential nature of a class of phenomena which interests alike the physician, the surgeon, and the accoucheur—viz., the changes in organic substance which are designated by the general term fermentation."[2] This address, I well remember, was delivered from behind a table covered with the paraphernalia required to demonstrate Lister's contention that neither milk nor blood have any inherent tendency to putrefaction, and that if either of these fluids was drawn and preserved under what we should nowadays call "sterile conditions," it remained free from putrefaction indefinitely. This, which is all at the present day accepted doctrine, as

> "Most can raise the flowers now,
> For all have got the seed."
>
> —*Tennyson.*

was not so 50 years ago.

When Lister came to London bacteriology as a science was non-existent; the connexion of fermentation and putrefaction with the healing of wounds was unknown or scouted or even ridiculed; if a wound healed by "first intention" it was looked on as an exception, and the rule was that suppuration was Nature's usual process of repair, and that pus might even be, as it was termed in those days, "laudable." Anyhow, this first lecture was looked on as a bad start, and altogether unsuitable, for it was generally agreed that such an abstract subject as lactic acid fermentation was no concern of a surgeon. This first plunge in the lecture theatre of King's College was certainly chilly, but it was at the hospital that Lister encountered his full sea of troubles. He had stipulated that he should be allowed to bring with him from Edinburgh four assistants already trained in his methods, and attached solely to his service. This was a cause of offence, because in those days operations were so few that one house surgeon and one operating theatre were sufficient for all the surgeons on the staff.

Of the four who accompanied Lister from Edinburgh to London, one, Dr. James Altham, of Penrith, is dead. Of the surviving three, one is Dr. W. H. Dobie, who has long held a high position in Chester. The two others are with us this evening. One a Highlander in blood and type, is Dr. John Stewart, of Halifax, in Nova Scotia. He is one of the most affectionate pupils of the master, whom he has drawn in many letters and pen pictures. The fourth had been Lister's last house surgeon in Edinburgh, and was his first in London. He is with us this evening. He is known to us all as Sir William Watson Cheyne, who succeeded his master as professor in King's College Hospital, became President of the Royal College of Surgeons, served his country on land in the Boer war and at sea in the Great War, reached the rank of Admiral, sat in the House of Commons as Member of Parliament, and is now Lord Lieutenant of Orkney and Shetland. But perhaps his greatest work, and the one I imagine he looks back on with the keenest satisfaction, is his long and loyal service, in hospital and in private work, with the Messiah of surgery, whom he served so faithfully as an apostle to the Gentiles.

The peace-loving Quaker spirit of Lister was also much distressed by the opposition he met with at the hospital from the nursing sisters of St. John. At that date the hospital authorities farmed out, so to speak, their nursing to an Anglican community much given to ritual, frigid rules, repressive formality, and petty restrictions. In the days of Sir William Fergusson the teaching was entirely in the wards; he passed from bed to bed, followed by a sister with a towel and a basin of water, in which he dipped his hands after examining a patient. Lister upset the pious sisters by copious ablutions and the purification of many pairs of hands before a patient was touched, and many of his cases were carried or wheeled into the theatre as subjects for clinical lectures. These sisters of St. John were opposed to Lister and all his ways, and dealt him those pious and smiling stabs in which women, particularly good women, are so skilful. Patient, courteous, self-controlled, Lister exhibited no resentment, never retaliated, and only showed how he felt it by the little gasping sigh we all learned to know and to respect as his only sign of sorrow or annoyance.

Worse than these two gales in his sea of trouble was what John Stewart describes as the "colossal apathy," the "monstrous inertia to the force of new ideas," the inconceivable indifference shown by the students and surgeons of London. Fifty years ago the wards of most of the hospitals in England reeked with the stench of putrefaction, just as they had done for centuries. But Lister's wards were free from what was everywhere accepted as the recognised "hospital smell"; his dressings when taken off were free from pus and fœtor; they were handed round for confirmation, and I well remember the surprised and approving sniff with which the visitor—generally a foreigner—confirmed Lister's frequent and pleased remark: "You will notice, gentlemen that any discharge is only serous and is quite sweet." Yet Londoners did not come to see his epoch making change, to hear, to smell, and to be converted.

In Edinburgh Lister's class frequently numbered 400 students; in London, some 10 or 20 might turn up, but these gradually fell off. Ten years after his arrival Lister referred to his small classes at King's, after his crowded audiences at Edinburgh, as "a humiliating experience." To-day, after 50 years, with new conditions and changed mentalities, it is perhaps superfluous as well as somewhat difficult to explain this neglect. I think the faulty method of teaching and examination had much to do with it. Lister's teaching did not help a man very much to pass an examination and secure a diploma. He was therefore neglected by the average student, while he cast a lifelong spell over those who, as dresser or house surgeon, came under the potent power of his personality.

It is more difficult to suggest the reasons why London surgeons neglected or belittled his work. One was that the discoveries of Pasteur, on which Lister's conceptions of wound infection were based, were too recent, and too little known to be understood as the basis of his principles. Bacteriology had hardly come into existence 50 years ago. Another possible reason was that Lister had, by way of experiment, to try many things in his application of these principles to wound dressing. In these efforts he moved from carbolic lotion to boric, or made trials of corrosive sublimate, and then reverted to carbolic. Or he saturated his gauze with carbolic or iodoform or eucalyptus, or double cyanide of mercury. These frequent changes were all causes for stumbling to the average individual who had not grasped the first principles, and was therefore doubtful of a so-called "system" which was not definite or final (later in history these frequent modifications were counted to Lister for righteousness, for they demonstrated that it was the principle which mattered and not the methods of technique). Another reason was that the surgeons of the latter Victorian period, just like Astley Cooper, Abernethy, and John Hunter, were all in the dark as to how wounds became unhealthy. The generally accepted view was that the air, or some "miasm" in it, was at the root of the mischief. Surgeons without Lister's scientific training and Pasteurian knowledge looked upon his methods as but another variant of many previous empiric and hopeless efforts. Lister himself realised this, for in one of his addresses he said: "I venture to assert that no one who has not a belief in the germ theory of putrefaction can

[2] Brit. Med. Jour., 1877, ii., 465.

ever perform satisfactorily the antiseptic treatment of wounds." How far the London surgeons were from being able to appreciate this is shown by an annotation in THE LANCET in 1877 (vol. i., p. 361) which said: "In many quarters Mr. Lister has acquired the reputation of a thoughtful, painstaking surgeon, and has done some service to practical surgery by insisting on the importance of cleanliness in the treatment of wounds, although this has been done by the glorification of an idea which is neither original nor universally accepted."

Still, making all allowances, it is difficult to explain why London was the last place to accept the new evangel. The *British Medical Journal*, which had always supported Lister, writes "of that great principle in surgery, which had been accepted almost everywhere else before it was listened to in London."

But if students and London surgeons were apathetic over the revolution in surgery being wrought in their very midst, it was not so with the foreigners. When I was house surgeon with Lister, 44 years ago, there was in the entrance hall of the old hospital a painted notice board forbidding smoking in English, French, and German. It ran thus:—

> "Smoking is forbidden.
> Il est defendu de fumer.
> Das Rauchen ist verboten."

In 1883 foreigners poured into King's College Hospital, from the ends of the earth, crowded the entrance hall, and there, while waiting for the master, they would make the air thick with tobacco smoke. In later years, when Lister's evangel had gone forth over all the earth, and he was neglected by both students and visitors, many must have wondered at the need of this polyglot announcement. It survived as a memento of the few early years in London when the prophet was still without honour in his own country, but was attracting from overseas the seekers after truth. Already in 1875, two years before coming to London, Lister, during a prolonged tour in Germany, was received everywhere with enthusiasm. In the words of THE LANCET, "the progress of Prof. Lister has assumed the character of a triumphal march" (June 19th, 1875). In 1879 Lister's appearances at the International Congress of Medicine at Amsterdam were greeted with "an enthusiasm which knew no bounds."[3]

At the next International Congress in London in 1881 foreign surgeons must have marvelled amongst themselves when they heard British surgeons still attempting to cast doubts on his principles or belittle his results. But let us, in parenthesis, project our attention forward to the following International Congress in London. It was in 1913. Lister had died the previous year, but the light of his good work was shining before all men. As is well known, congresses and such like events are often commemorated by the issue of a medal. The medal of 1881, when Lister's work was slighted and belittled by his own countrymen, bore the features of Queen Victoria. But in 1913 it was felt in Britain that the one effigy worthy of being stamped on the medal of an International Congress in London was the head of Joseph Lister.

My audience will hardly believe me when I tell them that in my student days the surgeon of one of the largest teaching hospitals—a Fellow of the Royal Society, and a President of the Royal College of Surgeons—frequently raised an appreciative laugh by telling any one who came into his operating theatre to shut the door quickly, in case one of Mr. Lister's microbes should come in.

The first case in which Lister wired a fractured patella was in 1877. When I was his house surgeon I had the honour of bringing together and exhibiting six of the seven first cases which he showed before the Medical Society of London on Oct. 29th, 1883.[4] Some of them were recent cases and others were old, ununited fractures. All were successful. I well remember the astonishment with which Fellows of the Society tried to feel the buried silver wire: but others were aghast at the unwarrantable danger incurred in opening a healthy knee-joint, and so running the risk of ankylosis, or of amputation or even death. One hospital surgeon, Morrant Baker, asked, "Had not anchylosis, amputation, and death been heard of after its performance?" Another said, that if the next case died, Lister should be prosecuted for malpraxis, while a third exclaimed: "C'est magnifique, mais ce n'est pas la chirurgie." This bon mot helped, in subsequent years, to lessen the reputation of its brilliant author. In those days the peritoneal cavity, the pleura, and the synovial cavity of any joint were all sacrosanct spaces, and were rarely invaded by the surgeon. Ovariotomy results at King's College Hospital had been so disastrous that the governors had forbidden the staff to undertake it.

Although Lister was carrying out operations never before attempted in the history of surgery, it is interesting to record that I never saw him do an abdominal section. During my term of office we never heard the word "appendicitis"; gastric ulcers were diagnosed but never treated surgically; ovarian cysts were tapped and tapped until the patient died; that a calculus could be removed from a ureter or a bile-duct never entered the imagination of the wildest dreamer.

In those early years of Lister's advent a little personal recollection will illustrate how slowly his gospel spread, yet how courageously confident the master was of his mission. One day, in 1883, after he had been six years in London, I was standing beside him on the steps of the hospital, waiting (as is the way with deferential house surgeons) for his carriage to pull up. We had been discussing the attack made on him for having the temerity to open a healthy knee-joint. He began by quietly remarking that the day must surely come when the profession would accept the principles of his methods, "and," he added warmly, "if the profession does not recognise them, the public will learn of them, and the law will insist on them." Then, placing his hand on my shoulder he added pathetically, "Thomson, I do not expect to live to see that day, but you may."

Shortly afterwards I went abroad and spent some years on the Continent. To state that I had been Lister's house surgeon served as a *laissez-passer* to make me welcome in any foreign hospital I visited. Everywhere I found Listerian principles had been embraced and his methods pursued with brilliant success. When I settled again in London in 1893 I found the whole surgical atmosphere had changed during my ten years absence. Younger surgeons, more open to conviction and less wedded to old routine, had come along, and late converts concealed their overdue repentance by rapturously embracing asepsis, and vaunting its superiority over the "antiseptic system" as it was still called. Soon after my return, in 1897, the year of Queen Victoria's second jubilee, Lister was made a peer on New Year's Day, his peerage having been the first ever conferred upon a surgeon. In a picture of his coat-of-arms you will notice that the serpent of Æsculapius, for the first time in history, appears in the quarterings of a peer of the realm.

In the following May an address and dinner were offered to him by 30 old house surgeons and 100 dressers. As secretary of that festival I had to make a little speech, and took the opportunity of reminding the chief of his words to me on the steps of the hospital 14 years previously, and I pointed out that he had not been imprisoned like Galileo, nor burnt at the stake like Giordano Bruno, nor crucified like other pioneers of truth, but that he, as well as I, had lived to see the day when his principles were universally accepted. Then drawing from my pocket a newspaper of that very day, I called attention to the fact that,

[3] Brit. Med. Jour., 1879, ii., 453.
[4] Proc. Med. Soc., Lond., 1884, vii., 8.

anyhow, the other part of his prognostication had been fulfilled, for this newspaper recorded that a midwife in Germany had been sent to prison for manslaughter, as she had attended a confinement without providing herself with a proper antiseptic outfit. These intervening years had seen the completion of his mission since he left Edinburgh in 1877, —20 years previously—to take that cold plunge into a sea of troubles. His task was done, and there is little to record of the dwindling years.

In 1892 Pasteur's jubilee was celebrated. Lister was the predominant personality amongst all who came to honour the great French scientist. This event is recorded in a most striking picture, which not only suggests the one-sided feebleness of the semi-paretic Pasteur, leaning on the arm of Carnot (the President of the Republic) but, in a marvellous manner, the artist, Rixens, gives a most life-like representation of Lister's features, his figure, and even of his hands, gestures, and gait. Lister had retired from the active staff of King's College Hospital in 1893 at the age of 66. He was President of the Royal Society from 1895-1900. In 1903, for the first time, his stalwart frame was shaken by a threatening of the infirmities of age. The Continental journeyings he had enjoyed so frequently and so thoroughly were abandoned. His last years were saddened by slowly failing health, and on Feb. 10th, 1912, in his 85th year, he died peacefully at the little fishing village of Walmer, looking out on the English Channel.

What was the personality of this master of surgery? He was tall, upright, well knit, stoutly built, deep chested; his bearing was dignified, and his manner always serious, restrained, courteous, and considerate. He had a profusion of thick iron-grey hair, worn somewhat long, as had been the fashion in his youth. Except for small side-whiskers, he was clean-shaven. I never saw him in any other pattern of collar or necktie than those seen in all his portraits, a black silk bow tie and an upright collar with the peaks turned down over it. His costume never varied; he always wore a frock coat made of the shiny black material called broadcloth, and nowadays only seen on undertakers and country hotel waiters.

His voice was low and musical; there was little resonance or ring, and it had a rather attractive hollowness about it—what, as a laryngologist, I would call a voice of some "phonative waste," due to want of tension in his vocal cords. This tone—or want of tone—in his voice may have been connected with an occasional slight stammer. This trifling hesitation in his speech had persisted from childhood. It was very transitory and never embarrassing. Some thought that the extra effort and emphasis required in overcoming its occasional occurrence added a little charm to his speech, but he himself was very conscious of it, and referred to it as "a severe thorn in the flesh."

His manner was generally serious, but relieved by what Dr. John Stewart calls his "gentle manner and somewhat pensive smile." His manner had a certain aloofness about it. His lifelong disciple, Watson Cheyne, confesses that Lister always inspired him with a certain sense of awe. I myself always felt that his soul was "like a star and dwelt apart," and that, as Wordsworth said of Sir Isaac Newton, his face showed—

> "The marble index of a mind for ever
> Voyaging through strange seas of thought, alone."

Yet he commanded not only veneration, respect, and admiration, but a feeling of complete trust and devotion which could only be explained by the nobility and sincerity of his character.

After a separation of 34 years, his former pupil and house surgeon, John Stewart, could write: "It is beyond my power to express the feelings of reverence and love I have for Lord Lister, or to say how much his life has been to me." For my own part I can only say that no teacher, no friend, no man I have ever known has left his impress on me as Lister has done. To none of them do I feel the debt I owe to him, for the example of his veracity of thought and word, his patience under persecution, his constancy in the pursuit of truth, his eagerness to instruct his pupils, his long-suffering with stupidity, his tenderness to the poor and his gentleness to the sick and maimed. He was imbued, I need hardly say, with a truly scientific spirit. His studies in physiology and pathology and their bearing to clinical surgery will be referred to in addresses by experts during this centennial week. He urged the necessity of experimental and laboratory research. In 1875 Queen Victoria, to whom only one side of the question had been presented, wrote requesting him to take action for the suppression of vivisection. Although he held a court appointment, he had the courage to decline an invitation he could not conscientiously accept. He wrote to her private secretary as follows: "I should deeply regret that I cannot see my way to comply with this request, were I not persuaded that my doing so would not promote the real good of the community, which I know to be Her Majesty's only object in the matter."

In the same way, although he used all the cases in his service very freely for class demonstration and instruction, his patients never resented it—were even proud of it—for he never neglected to let them feel that they were regarded as fellow human beings as well as so-called "clinical material." One of his sayings was, "The individual patient asks to be relieved and not to be studied," which reminds us of the great saying of a Frenchman "L'amour de la médecine fait le savant, l'amour du malade fait le médecin." To demonstrate his consideration and kindness to everyone, I will throw on the screen a fascimile of a letter written by Lister to the house surgeon who preceded me, the late Dr. R. G. Lynam, of Oxford. It will be noticed that the letter is entirely concerned with the interests of his students and a hospital patient, for whom he shows a touching consideration. He sent the letter to the hospital by special messenger, there being no telephone in those days. Typewriting machines were also in their infancy, and you might think that this written letter had all been penned by Lister, so similar is the signature of the body of the text. As a matter of fact it was like most of his letters, written by his wife, and only signed by him. Here is another instance of his singlemindedness and honesty. Like all great men he was keen on the importance of small details. In showing us how to bandage a breast he insisted on the point that, in spite of various turns, the bandage was almost sure to slip and allow a dressing to be displaced if the transverse turns of the bandage, above and below the prominence of the mamma, were not prevented from slipping up and down by uniting them with a safety pin, which securely prevented them from drifting apart. To impress this point upon us he narrated that he had once had to open a simple abscess in the axilla for Queen Victoria. All went well. After one dressing and on arrival at the railway station to travel back to Edinburgh, he suddenly remembered that he had forgotten the important safety pin. He at once drove back to the Castle, and explained his oversight to Her Majesty, and the necessity for rectifying it. Some surgeons, I fear, would have thought first of their own reputation, and would have "risked" the safety pin.

He felt checks and disasters very keenly at the time, but a certain buoyancy soon restored his equanimity and forward-looking temperament. He himself writes this when on a holiday: "I have the happy faculty of being able to throw off all thoughts of work for the time being." He fished, but as his biographer remarks, he was a diligent amateur but never an expert. He skated and could do 8's and 3's—but of small dimensions. He took a fair share of vacation, and on his holidays could be light-hearted and boyish. But complete idleness was not congenial to him; on his holidays there were usually proofs to correct, or addresses to prepare. On the Continent he practised and improved his very good French and

German, and in both of these languages I have often heard him speak fluently, easily, and without preparation. He was devoted to walking and excursions. He was interested in botany and bird life; and he could always fall back on a pocket edition of Horace, Dante or Goethe.

Lister's hand was large and neither graceful nor delicate looking; yet he was very neat with his short thick fingers, as is proved by his plastic and soft palate operations, and by the fact that in early days he performed ophthalmic operations. We are fortunate in possessing a skiagram of his hand, one of the earliest records of the X ray. It does not tell us much; the strength, delicacy, and skill of a hand resides chiefly in the controlling brain. He was a steady, firm, and deliberate operator. With the least exertion he perspired freely, and it was always one nurse's duty to stand behind him ready armed with a clean towel to which he frequently turned during an operation to mop his streaming forehead.

It is interesting to visit the surgical block of the great hospital in Rome the "Policlinico Umberto I." The bas relief in the tympanum over the main entrance shows Lister operating, and wearing a white gown. Now, Lister never wore a white gown, nor a mask, nor gloves. He frequently never removed his coat, but simply rolled his sleeves back, and turned his coat collar up, so that his white starched collar would not be made sodden by the cloud of carbolic spray in which we operated. Sometimes he removed his black frock coat and an ordinary towel was pinned across his chest. I myself, for operations, put on an old blue frock coat which I had worn for years previously in the dissecting-room. It was stiff and glazed with dry blood. Yet our cases, as I remember them, healed as rapidly and as smoothly as they do with all the ceremonial and ritual of sterilisation and asepsis nowadays. The operating table served for all cases—sterile or suppurating. The floor, also of wood, was made of ordinary deal planks. The instruments, which had been carefully washed after they had been last used, were soaked for an hour in 5 per cent. carbolic lotion before use; the site of operation had been purified by a wet 1 in 40 carbolic dressing, applied for 12 to 24 hours before operation; the neighbourhood of the operation was cut off by ordinary towels wrung out of warm 1 in 20 carbolic lotion; during the operation any suspicion of "contamination" (as we called it) of hand, instrument, or wound, was corrected by sluicing them with the 1 in 40 carbolic lotion; and the whole performance was carried out in clouds of watery carbolic steam which poured over the field of operation from one or two spray machines. Lister called the spray an unconscious caretaker. It seems to me that the admirable results he obtained—wonderful in the days of 50 years ago and equal to anything done to-day—must, in spite of the surrounding drawbacks I have mentioned, have been largely due to the scrupulous care with which the wound, the instruments, and our hands were kept free of "contamination" and the promptitude with which any suspicion of chance contamination was dealt with. (One wonders if Lister's principles and teaching were as religiously carried out nowadays whether much of the ceremonial ritual would be necessary, and whether a great deal of the costly construction of hospitals and operating theatres would not be superfluous). On leaving King's College Hospital I became resident medical officer at Queen Charlotte's. I was there told that my period of office was the first in the memory of man without a death from puerperal fever. For many years I was followed by a succession of residents, all selected from King's men, so that they could continue the antiseptic methods I had introduced there.

Lister, this genius, this pioneer, created anew the ancient art of healing. He did more for surgery and mankind in his lifetime than all the surgeons of all the ages had effected since the days of Hippocrates. I venture to say that, as an instrument in God's hands, Lister has wrought more for the relief of bodily suffering, for the security of life, for the prevention of anxiety, for the conversion of sorrow into joy, for the promotion of happiness, and for the enrichment of mankind than any man who has ever trod this earth. The history of our world is divided into two periods, before and since the coming of Christ, B.C. and A.D. The history of medicine and surgery and of bodily suffering will always be divided into the times before and after Lister. He was our countryman, and the greatest of the masters of surgery; we have lived through the golden age when he evolved this miracle of healing which had waited for centuries for his coming, and now can be wrought by every surgeon in every country in the world. Any house surgeon, any newly qualified doctor, can to-day remove pain, arrest disease, and save life by perfectly safe operations which no man knew of, or, knowing, dare not adventure when Lister came to London 50 years ago.

Those who chanced to come near this great master caught glimpses of such a spirit as is seldom revealed to us. We are fortunate in possessing a perfect portrait of him in imperishable verse, written by W. E. Henley, who at one time was his patient in the Edinburgh Infirmary:

> "His brow spreads large and placid, and his eye
> Is deep and bright, with steady looks that still
> Soft hues of tranquil thought his face fulfil—
> His face at once benign and proud and shy.
> If envy scout, if ignorance deny
> His faultless patience, his unyielding will,
> Beautiful gentleness and splendid skill,
> Innumerable gratitudes reply.
> His wise, rare smile is sweet with certainties
> And seems in all his patients to compel
> Such love and faith as failure cannot quell."

Lister was born a Quaker, but he lived most of his life and died a member of the Church of England. He was blessed with a loving and devoted wife. She was the daughter of Prof. Syme, whom he had served as house surgeon in Edinburgh, and she appeared to have no thought or interest beyond her husband. She not only loved and shielded him in every way, but entered intelligently into all his work and researches; helped him in his studies; worked in his laboratory; wrote his letters; and always when I arrived at his house in the early morning to go with him to a private operation I would find Mrs. Lister preparing and checking off his instruments. In their pleasures as in their work they were united. They were inseparable companions on all his holidays, and in the numerous Continental trips he loved to make. It was while on one of these in Italy that his wife died, after a brief illness in 1893. They had no children, and after her death Lister was a lonely man. He lies buried beside her in West Hampstead Cemetery.

As illustration of his noble spirit I will give a few sentences from two of his addresses. As a young professor of 33 he told the Glasgow students in his Inaugural Lecture in 1860 that the two great requisites for the medical profession were—"first, a warm loving heart, and secondly, truth in an earnest spirit." Eighteen years later, in a graduation address to newly qualified students, he said: "If we had nothing but pecuniary rewards and worldly honours to look to, our profession would not be one to be desired. But in its practice you will find it to be attended with peculiar privileges, second to none in intense interest and pure pleasure. It is our proud office to tend the fleshly tabernacle of the immortal spirit, and our path, if rightly followed, will be guided by unfettered truth and love unfeigned. In the pursuit of this noble and holy calling I wish you all Godspeed."

In the north transept of Westminster Abbey, as we all can see on Wednesday morning, there is a marble medallion of Lister's bust, placed near to those of the great scientists, Darwin, Stokes, Anderson, and Watt. At the public funeral service in the Abbey on Feb. 16th, 1912, there was sung an anthem of Handel's to words so peculiarly applicable to our dear master that I cannot better conclude than by quoting them: "When the ear heard him, then it blessed him, and when the eye saw him, it gave witness of him; he delivered the poor that cried, the fatherless, and him that had none to help him.

Kindness, meekness and comfort were on his tongue. If there was any virtue and if there was any praise, he thought on those things. His body is buried in peace, but his name liveth for evermore."

A DOMESTIC SURVEY.[1]

BY SIR HUMPHRY ROLLESTON, BART.,

LATE PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

WE are here to commemorate the centenary of one of the greatest benefactors of mankind, Joseph Lister, born on April 5th, 1827, at Upton House at Upton in Essex, then hardly even a village, now swallowed up in this great city and in the Borough of West Ham which has the honour of having had him as a Freeman.

He was the fourth child and second son of Joseph Jackson Lister (1786–1869), who had a world-wide reputation for his discoveries in optics and the perfecting of the modern microscope by achromatic lenses, thus becoming a Fellow of the Royal Society of which his son was destined to be President. Arthur (1830–1908), another son of Joseph Jackson Lister, was also a Fellow of the Royal Society and distinguished for microscopical research, writing with his daughter Gulielma a monograph on the Mycetozoa; one of his sons, the late Joseph Jackson, was also a Fellow of the Royal Society, and another, Sir William Tindall, is ophthalmic surgeon to the adjacent London Hospital. The Becks, connexions of the Lister family, were well known as opticians. The late Sir Rickman Godlee (1849–1925), who wrote the life of his uncle Lord Lister, was President of the Royal College of Surgeons of England. The scientific record of the Lister family is therefore remarkable.

The Listers belonged to the Society of Friends, founded by George Fox in 1643 who in 1650 admonished Justice Bennet of Derby and those present to quake at the name of the Lord, hence their alternative title. Being debarred by their religious tenets from the older universities, from taking holy orders, and joining the fighting forces, and by cutting themselves off from vain sports and places of diversion, such as hunting, theatres, and music, the Friends were much given to education and to the study of science and natural history. Thus a relatively large number of them became Fellows of the Royal Society. The Quaker atmosphere of quiet goodness, which originated so many of the philanthropic movements of the nineteenth century, and the study of nature admirably fit the members of the Society of Friends to minister to the sick, and there have been many famous medical men among them. The greatest man of genius who ever entered the medical profession was Thomas Young (1773–1829), "alike eminent in every department of human learning," who foresaw X rays and electrons, was, like Lister's father, a pioneer in optics; and, like Lister again, shed the external observances of the Society of Friends when working in Edinburgh. Among other well-known Quaker medical men were Thomas (Baron) Dimsdale, who, in 1768, successfully inoculated Catharine Empress of Russia against small-pox; John Fothergill, whose country seat with its wonderful gardens was Ham House close to Upton House, Thomas Hodgkin (1798–1866) who described what is now known as "Hodgkin's disease," and founded the Aborigines Protection Society, and more recently Sir Jonathan Hutchinson of the London Hospital, a contemporary of Lord Lister's. None of the Lister family, except a distant cousin, had been a doctor, but when a child Joseph Lister had decided for himself that he would be a surgeon, and this desire strengthened with his age; his father, though not encouraging this ambition, wisely left his son to work out his own salvation, and as it resulted that of his fellow men.

Joseph Lister was educated at Quaker private schools at Hitchin and Grove House, Tottenham, and in 1844 entered University College, London, which is this year celebrating its centenary. Here he worked for nine years, being a spectator of Robert Liston's first operation under a general anæsthetic in 1846, and having many opportunities of watching the ravages of erysipelas, blood poisoning, and hospital gangrene, then the unavoidable accidents of surgery. In 1853 he went to Edinburgh, originally for a short visit, but remained for seven years, marrying in 1856 Agnes, daughter of James Syme, whom he was destined to succeed in the professorial chair.

The two great events in the history of surgery are the introduction in 1846 of anæsthetics, which made surgery possible, and has been called "the death of pain," and the discovery of the antiseptic and aseptic method dating from 1867, which has made surgery safe for humanity and may in like manner be termed "the death of infection." In 1865, which may therefore be called the birth year of the antiseptic method, Lister began the campaign to prevent germs in the air from getting into wounds and so, by the resulting blood poisoning, rendering operations a most perilous form of treatment. Lister had long been thinking and preparing how to obviate the risks of the diseases which attacked patients after operations, but the discovery in 1865 that germs of micro-organisms caused putrefaction was made by the great Louis Pasteur, who was a chemist not a medical man, really showed him the way. Most surgeons if they heard of Pasteur's researches would have been mildly interested in them, but Lister was able to grasp their significance, and henceforth devoted his life to applying this principle to the prevention of post-operative infection. His brilliant imagination, philosophic insight, untiring industry, and unflinching courage overcame the antagonism, not to mention ridicule, that his life-saving work provoked, and he finished his task. In 1867, just 60 years ago, Lister published his first papers on antiseptic surgery, and from that time he continued by most careful and indomitable research to improve the methods.

It is almost impossible to describe the world-wide transformation of surgery which was brought about by Lister's work. The history of surgery has indeed been divided into two periods, that before and that after Lister's methods became adopted; before his discovery as few operations as possible were done because of the risk that they would be followed by erysipelas, blood poisoning, pyæmia, hospital gangrene, tetanus, and death; abdominal operations, such as are so constantly done now for appendicitis, were practically unknown; to open a large abscess was almost certainly to sign the patient's death warrant. Hospitals indeed were spoken of as "houses of death."

Lister, who was professor of surgery in Glasgow from 1860 to 1869, became professor of clinical surgery in Edinburgh in succession to his father-in-law James Syme, and there continued to practise, preach, and perfect the doctrine of antiseptic surgery. Like most great advances and reforms, this life-saving discovery met with much opposition and criticism, and in order to overcome these adverse influences and to spread the knowledge of the correct method of carrying out the antiseptic treatment, he accepted in 1877, when 50 years old, an invitation to be professor of clinical surgery in King's College, London, for be it said, with regret, his native city was the stronghold of antagonism. His London life falls into two almost equal periods; from 1877 to 1893 he was a busy hospital surgeon gradually convincing all of the inestimable value of the antiseptic methods; in 1893 his retirement from the hospital, on account of age, and the sudden death of his devoted wife, leaving him a childless widower at the age of 66, entirely altered his life. Henceforth, with rare nobility of character, he devoted himself to public duties; he became President of the Royal Society in 1895 in succession to Lord Kelvin, and President of the British Association in 1896, giving his address on "The Interdependence of Science and the Healing Art." He died on Feb. 10th, 1912, at Walmer, and was buried

[1] Address delivered at Lister's Birthplace, Upton, on April 5th.

at Hampstead by the side of his wife, after a most impressive service in Westminster Abbey. Like Pasteur, and more fortunate than many reformers and pioneers, Lister lived to see his work bear fruit exceedingly, and died full of years and loaded with honours from all countries, but it is as the greatest material benefactor of the human race, who made surgery safe, and thereby did more than any other man to prevent suffering and save life, that we regard him with deep gratitude and thankfulness.

THE CONQUEST OF SEPSIS.[1]

BY SIR JOHN BLAND-SUTTON, BART.,
LATE PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

CENTENARIES remind us of our predecessors and reawaken our memories to the benefits we derive from their discoveries. The discovery of the anæsthetic properties of ether and chloroform 80 years ago is a landmark in the history of surgery; and it is common knowledge that 20 years later surgical operations increased enormously in number in all big cities, and postoperative sepsis became so common and so mortal as to threaten the extinction of operative surgery as an art. Endeavours to ascertain the cause of sepsis exercised the minds of the greatest surgeons.

The principles underlying the treatment of wounds were based on the idea that festering was due to something which entered wounds, and the time-honoured methods adopted in treatment consisted in removing any foreign body that might be in the wound; to staunch the bleeding, usually with the aid of styptics, then close the wound and allow it to heal. The styptic might contain something to stimulate the healing process. This method of treating wounds can be traced back 3000 years; it was practised by famous physicians in the Trojan war.

All who are acquainted with Virgil's Æneid can recall this stirring story: When the hero Æneas was wounded in the thigh with a dart, the celebrated Trojan physician Iapyx came to aid him. After some trouble the head of the dart was extracted and Iapyx instilled into the wound a tincture to which the goddess Venus added, unknown to the physician, some juice prepared from the stalk, leaves, and flowers of dittany from Crete. Suddenly all pain fled from the wound, and all the blood in the deep wound was staunched. Æneas soon recovered his vigour and, urged by Iapyx, returned with zest to the fight.

In 1866 a patient was admitted into the Glasgow Royal Infirmary with a compound fracture of the leg and had the good luck to come under the care of Joseph Lister, the professor of surgery, who treated the fracture on the same principles as Iapyx treated Æneas, but instead of a tincture containing dittany he instilled into the wound a solution of crude carbolic acid. There was nothing poetical in this, but the result exceeded Lister's expectation for the patient recovered with a useful limb. The usual treatment at that time was amputation, and even in such an event the patient usually died from sepsis. The successful issue in this case was of the utmost importance for it laid the foundation of the glorious edifice of Antiseptic Surgery.

The treatment adopted by Lister in this instance was no sudden inspiration. When he served as Syme's assistant surgeon in Edinburgh in 1856, post-operative sepsis was endemic in every infirmary and hospital in the British Isles. Lister attributed sepsis to something which entered wounds. He believed that putrefaction was caused by the oxygen of the air; chemists believed this. Lister thought that sepsis could be communicated to wounds by instruments, sponges, and the fingers of surgeons and attendants. He devised means for preventing infection and selected carbolic acid at that date called creosote, a chemical novelty used for deodorising sewage, for the purpose of destroying the agents of sepsis, and he adopted the word Antisepsis for his method. Whilst Lister was busy with these investigations Cohn made the important discovery that yeast was a microscopic plant. Pasteur discovered that fermentation and putrefaction were due to the action of microbes. Lister welcomed Pasteur's demonstration "that putrefaction like other true fermentations is caused by microbes growing in the putrescible substance." These brilliant discoveries proved that the apparently dissimilar processes—fermentation, putrefaction, suppuration and sepsis—are due to the action of minute living organisms.

Pasteur's discovery revolutionised the methods of the winepress, brewery, dairy, and sewage farm; Lister's transformed the methods of operative surgery, and they are by no means limited to mere wound treatment; they have led to extraordinary changes in surgeons, hospitals, and lying-in chambers. All great changes introduced into an ancient craft stir up opposition and ridicule. Some cautious surgeons who laughed at antisepsis endeavoured to follow the method. Others who jibed went slowly, but surely, to the wall.

In the face of opposition Lister pursued his course apparently unruffled. The younger surgeons—enthusiastic converts—adopted his principles and gradually introduced the methods of the bacteriological laboratory, sterilisation by heat. This ultimately became the Cult of Asepsis. Indeed, heat is the most perfect antiseptic known. Odoriferous carbolic acid persists as a memory!

Since 1900 operative surgery has advanced with such strides that text-books of surgery have become, like railway time-tables, useful only for a season. Surgical methods change monthly. Operating theatres which resembled shambles in 1860 are replaced by rooms of spotless purity containing scintillating metal furniture and ingenious electric lights. All concerned in the operation are clothed from nose-tip to toe-tip in sterilised linen garments, and their hands covered with sterilised rubber gloves. The patient is in a sleep as deep as that of Adam in Eden; and the theatrical silence is only broken by the rhythmical breathing of the patient or an occasional utterance from a nervous operator. Modern surgery is wonderful. I was trained in the old school and lived to revel in the wonders of the new. But this is not the end; the legitimate function of surgery is the repair of physical injuries. We must strive to cure morbid growths with drugs prepared by biochemists. We may believe that chemotherapy and physics, which have furnished surgeons with powerful and reliable remedies, will help to deliver mankind from some of the most distressing and unpromising operations of modern surgery.

There are clear signs of the dawn of such an era. The dominating features of Lister's life were his persistent enthusiasm and faith for the cause he had at heart; and his courage in the face of the incredulity of contemporary surgeons is beyond all praise. The propagation of a New Gospel in religion, science, or art demands forceful disciples. If Lister had had an apostle with the zeal of Saul of Tarsus, or a disciple with the eloquence of Huxley, the Listerian principles of wound treatment would have been universally accepted before 1900. In spite of this, Lord Lister had the rare privilege of living to see his principles adopted by surgeons throughout the world.

The bronze figure of Lord Lister in Kelvingrove Park exemplifies his steadfastness in the pursuit of Truth; the granite block which supports it is typical of the firm foundation on which his discovery rests. The monument is an expressive tribute to the great surgeon, whose influence will remain as long as surgery is practised as an art, and the conquest of sepsis will continue to be a blessing on every race of mankind.

[1] Address delivered at the Lister Centenary Celebrations in Glasgow.

THE CENTENARY CELEBRATIONS

THE Centenary celebrations commenced with the reception by the King at Buckingham Palace of about a hundred delegates from all parts of the world. Among them may be mentioned :—

Foreign Countries.

The Argentine Minister (Argentine), Dr. Otto Stapf, (Austria), Prof. Dr. Vilhelm Schaldemose (Denmark), Prof. Ali Krogius (Finland), Dr. Pierre Bazy, Prof. Henri Hartmann, Dr. Pasteur Vallery-Radot (France), Prof. Dr. Max Ritter von Gruber, Prof. Dr. Albrecht Kossel, and Prof. Dr. Max Rubner (Germany), Prof. Dr. C. F. A. Koch (Holland), Signor Roberto Allasandri (Italy), Prof. Johan Nicolaysen (Norway), Prof. Casimir Kostanecki (Poland), Sir Arthur Schuster, F.R.S. (Spain), Prof. S. Gustaf Hedin (Sweden), Prof. F. de Quervain (Switzerland), Prof. Melvin S. Henderson, Prof. Dean de Witt Lewis, and Prof. William George Maccallum (United States of America).

Overseas Dominions.

Prof. Kerr Grant, Mr. R. Hamilton Russell (Australia), Prof. Irving H. Cameron (Canada), Major-General J. B. Smith, I.M.S. (India), Prof. Daniel Colquhoun (New Zealand), and Dr. W. Watkins-Pitchford (South Africa).

British Delegates.

Sir John Rose Bradford (*President*, Royal College of Physicians, London), Sir Charles Sherrington (Royal Society of London and Italy), Sir Berkeley Moynihan (*President*, Royal College of Surgeons of England), Prof. George M. Robertson, (*President*, Royal College of Physicians, Edinburgh), Mr. A Logan Turner (*President*, Royal College of Surgeons, Edinburgh), Prof. Andrew Fullerton (*President*, Royal College of Surgeons in Ireland), Dr. George H. Edington (Royal Faculty of Physicians and Surgeons of Glasgow), Sir George Newman (Royal Society of Edinburgh and The Ministry of Health), Prof. J. Graham Kerr (Royal Philosophical Society of Glasgow), Sir Archibald Garrod (University of Oxford), Sir Humphry Rolleston (University of Cambridge), Prof. Percy T. Herring (University of St. Andrews), Prof. Archibald Young (University of Glasgow), Prof. John Marnoch (University of Aberdeen), Sir Harold Stiles, (University of Edinburgh), Sir William Taylor (University of Dublin), Sir Holburt Waring (University of London), Mr. George Grey Turner (University of Durham), Prof. F. Craven Moore (University of Manchester), Prof. Alfred W. Sheen (University of Wales), Prof. Leonard P. Gamgee (University of Birmingham), Prof. William Thelwall Thomas (University of Liverpool), Prof. J. Kay Jamieson (University of Leeds), Prof. Edward Mellanby (University of Sheffield), Prof. Edward Fawcett (University of Bristol), Colonel Thomas Sinclair (Queen's University of Belfast), Surgeon Vice-Admiral Sir Joseph Chambers (Navy Medical Service), Lt.-General Sir Matthew Fell (Army Medical Services), Air Vice-Marshal David Munro (Royal Air Force Medical Services), Sir Walter Morley Fletcher (Medical Research Council), Lord Somerleyton (King Edward's Hospital Fund for London), Dr. Eustace M. Callender (Medical Society of London), Sir Edward Sharpey Schafer (British Association for the Advancement of Science and the Physiological Society), Mr. Robert George Hogarth (*President*, British Medical Association), Sir James Berry (*President*, Royal Society of Medicine), Sir Cuthbert Wallace (Association of Surgeons of Great Britain), Sir James Kingston Fowler (Lister Institute of Preventive Medicine), Sir Frederick Andrewes, F.R.S. (Pathological Society), Dr. John Cowan (Royal Medico-Chirurgical Society of Glasgow), Dr. James Alexander Murray (Royal Microscopical Society), Sir Frederick Fry (Merchant Taylor's Company), Mr. Alfred Hepburn (*Master*, Society of Apothecaries of London), Prof. James Peter Hill (University College, London), Dr. Ernest Barker (King's College, London), Dr. Herbert Morley Fletcher (St. Bartholomew's Hospital), Mr. Charles Gibbs (Charing Cross Hospital), Mr. Walter Fedden (St. George's Hospital), Mr. Francis James Steward (Guy's Hospital), Mr. Arthur Cheatle (King's College Hospital), Prof. William Bulloch (London Hospital), Dr. Charles M. Wilson (St. Mary's Hospital), Dr. Eric Pearce Gould (Middlesex Hospital), Mr. Cyril A. R. Nitch (St. Thomas's Hospital), Dr. Archibald M. H. Gra (University College Hospital), Mr. William Turner (Westminster Hospital), Lady Barrett (London School of Medicine for Women), Dr. George Mackay (Royal Infirmary, Edinburgh), Mr. William George Black (Royal Infirmary, Glasgow), Colonel Donald James Mackintosh (Western Infirmary, Glasgow).

An address was presented to His Majesty by Sir Ernest Rutherford, the President of the Royal Society, in which the work of Lister was described as having effected more for the saving of human life and the prevention and relief of suffering than the scientific activity of any one other man. The speaker described Lister as one of the greatest benefactors of the human race, while pointing out the brilliant qualities for investigation that had been necessary in applying the discoveries of Pasteur to the problems of antisepsis, and developing modern surgery from that basis. The King in reply said :—

"I thank you for the address which you have presented. It is with pleasure that I receive the delegates who are present here to-day, and so take part in the Centenary Commemoration of Lord Lister's birth. Any country might be proud to claim Lord Lister as its citizen ; and I and my people heartily welcome the representatives of medical and surgical science, both from the Overseas Dominions and from all parts of the civilised world, who have come to join us in honouring his memory.

"You have truly said that Lister ranks among the greatest benefactors to mankind. Of all the many changes in the last 100 years none is more striking than the revolution in thought concerning surgery. It is hard now to realise the dread and apprehension with which formerly even a minor surgical operation was regarded. This change in our ideas is due partly to the discovery of anæsthetics and perhaps even more to Lister's work. Lister removed the horror of sepsis from surgical operations, and for this he is rightly described as the father of modern surgery. The principles discovered and laid down by him are to-day being worked out by his successors and are still fruitful of new applications.

"Naturally a layman looks first at the ultimate success and beneficent effects of Lister's work. These, however, were not the outcome of happy accident or sudden inspiration, but of long and patient study, of continuous experiment, and finally of a wide knowledge and penetrating insight, enabling him to discern the importance and practical bearing of observations which, to some minds, might have remained a piece of academic research.

"It is my earnest desire and hope that the Lister Centenary Celebrations may be in every way successful, and that this gathering of men of science from every quarter of the globe may conduce to foster and to strengthen the coöperation of all nations in the accumulation of scientific knowledge for the common benefit of the human race."

CELEBRATION AT KING'S COLLEGE HOSPITAL.

ADDRESS BY SIR WATSON CHEYNE.

A LARGE gathering assembled in the Refectory of King's College Hospital on Monday afternoon, April 4th, under the auspices of the Listerian Society, when the chair was occupied by the President of the Society, Mr. ARTHUR CHEATLE.

The PRESIDENT, in extending a warm welcome to the speakers and others who had known Lord Lister, said this centenary was being kept with gladness and with the deepest gratitude and pride ; gratitude that such a man had been born into the world to do such a glorious work, and pride because he was a fellow-countryman and was closely attached to King's College Hospital, as surgeon and consulting surgeon, for 35 years. Exactly 50 years ago he was President of this Society.

Sir W. WATSON CHEYNE said that some who had assembled to do honour to the memory of the master he, the speaker, had not seen since they left the hospital, and it warmed his heart to see them again. It was during the 16 years spent in this hospital that Lister completed the simplification of his methods of treatment, without in any way altering the principles on which those methods were founded. Lister's work was more widespread in its results than that of any other great man, for its influence on mankind was not limited to any country or any race ; the number of lives saved and the amount of suffering and ill-health prevented by it was incalculable. So sound were the principles that if anything went

wrong with an operation the surgeon did not blame this or that material he had used, or any of his helpers; he asked himself what he had himself left undone.

Sir Watson Cheyne continued: "It is just 50 years ago since Lister received an urgent invitation from the authorities of King's College Hospital, then situated in the vicinity of Lincoln's Inn-fields, asking him to go to London to fill the place in that hospital which had become vacant by the death of Sir William Fergusson in the preceding year. This request came as a thunderbolt to Lister. He had settled down in Edinburgh and was supremely happy in his life there. He had many friends who loved and admired him, not only for his ability but also for his gentleness and sympathy with suffering and readiness to help. His wife was a native of Edinburgh and had all her friends and relatives there. He had very large classes of enthusiastic students, and it was a great joy for him to teach them; his students loved and worshipped him and they were violently opposed to the attempt to get Lister to leave Edinburgh. At first Lister declined the proposal, but renewed requests of the most urgent nature made him ultimately agree to go to London, being chiefly influenced by the argument that his views and methods of treatment would spread more quickly from the metropolis than from Edinburgh, and by the fact that although something like 11 years had elapsed since his first publications there were really very few surgeons in London who had taken up his methods, and that these methods were opposed and derided by many men of great ability. Comfort and happiness were for him matters of little consequence as compared with the rapid adoption of his teaching by surgeons in general.

"I remember well this time 50 years ago, for only a day or two after Lister had received the invitation, and before he made his vital decision, he came down to the Edinburgh Infirmary early one morning and woke me up (I was his house surgeon at the time) to ask whether, if he decided to go to London, I would go also and again act as house surgeon, so as to start the treatment at King's and to teach the students; you can well understand that I was considerably excited at the prospect of migrating to London. Three other students were also asked to go as clerk and dressers—viz., Stewart, Dobie, and Altham—and they were equally excited and pleased at their selection to follow the master. You can well believe that we looked on our selection as an unexpected and unbelievable honour. No question of self had play, either in the chief's mind or in ours. We all felt as the old Crusaders must have felt and our only aim was to do our part of the work as carefully as we could so as to show those who were lagging behind how true was every claim made for Lister's methods.

"Whether Lister was right or not in accepting the London invitation is a very debatable point. Possibly his views did penetrate more quickly than from Edinburgh, but Lister missed the large number of students who followed him and filled the large lecture room in Edinburgh, and at times when the students at King's College (then quite a small school) who came to the lectures were few, or looked bored, he was very pessimistic. It is well known to all lecturers how much better a lecture is if there is a large and enthusiastic audience rather than a scanty and, apparently, unappreciative one. For some years I attended his lectures whenever I could manage to go, as I knew how much the presence of senior men pleased and comforted him. I thought for a considerable time that we had struck a poor type of student, and was very unhappy about it, but I found later on that the examining bodies did not favour "Listerism" and that the students were afraid to introduce the subject and hence did not want to learn his views till after they had passed their examinations. However, a good many men who were able to do so took an extra course, or stayed behind after passing the examinations, so as to see Lister's practice.

"I think one of the greatest, if not *the* greatest, characteristics of Lister was this extreme conscientiousness in his actions and in promulgating his views so constantly displayed in his writings, and particularly well shown when he got the invitation to this hospital. There is considerable difference of opinion as to whether his choice was right or wrong, but the decision was only taken after prolonged consideration of the matter. This care to get at the truth runs through all his work; it is very noticeable in his scientific papers and especially in his addresses. His care in this direction—viz., to ensure as great accuracy as possible—had the curious result that, when he had to deliver any important address, he was almost certain to arrive late at the meeting; the explanation being that, on going over the points of his discourse before leaving his house, something was very apt to occur to him as not sufficiently proven to justify his making a positive statement, and he would, even at the last moment, set to work to look into the matter. It is narrated of him that when he was delivering the Croonian Oration at the Royal Society on the coagulation of blood, a point struck him after he had left his home, and he turned into a slaughter-house, had an animal bled, and made the necessary observation before going further; he was, in consequence a good many minutes late. Another example of his conscientiousness was the way in which he dealt with his patients, whether private or in the hospital. If, on visiting them, they complained of pain or discomfort, however slight, he would set to work to rearrange the dressings, splints, pillows, &c., irrespective of other engagements; and this was very apt to make him late for appointments and so, contrary to what one would have expected, he never had a large private practice, as practitioners were too busy to make appointments with him, seeing that these appointments might not be punctually kept. In another way this conscientiousness troubled him a great deal—for example, when he was asked to give an opinion in a case on which he himself was not to perform the operation if one were decided on. In many cases the opinion that he felt to be the correct one might depend entirely on whether the wound would remain aseptic or not. If he advised an operation in which asepsis was essential, and the operation was [illegible]t done by him or by someone who believed in [illegible]d practised asepsis, his opinion, if acted on, might practically condemn the patient to death. In this transition period he therefore quite rightly looked on an opinion given by a surgeon as only applying to his own handling of the case, and he was very much against those who give advice after they have ceased to operate.

"Yet another example of Lister's conscientiousness I can give personally. When my eldest son was born, I asked Lister if I might call him Joseph Lister and if he would be godfather to the child. I candidly admit that I was not familiar with the activities of a godfather, but thought that it was a purely ornamental matter. In answer to my request he replied that he would like to consult Lady Lister first; the next day I received a letter from him saying that they would be very pleased to have the boy called after him, but that his life was so full and busy that he could not undertake further duties such as those of godfather. Apart from this conscientiousness Lister was full of sympathy with sufferers, and was always ready to do what he could to relieve suffering and to help those in need. One has only to look at his portraits to see these characteristics beautifully depicted. His readiness to help became well known and was sometimes much abused. Quite a number of supposed German professors who had come over to England to study lost their libraries on the voyage and came to Lister for help which they obtained most generously; but as time went on he found that this purchase of libraries was a severe drain on his pocket.

"In spite of the numerous ovations which Lister received on all hands, there was no affectation or

false pride about him. He appreciated all these honours and they were numerous, but they made no difference in his relations with other people or in any way show that he was conscious that he merited any special respect."

Sir LENTHAL CHEATLE joined in the welcome to old friends, especially Mr. Hamilton Russell, from Melbourne. He said that Lister was, in every way, the greatest man he had ever met. His great devotion to his work and his courtesy caused all who had dealings with him to revere him. To him a hospital was a sanctuary, and he would not endure any infringement of its sanctity. Once, when he had carried out a brilliant operation in 32 seconds, the onlookers cheered him, and Lister's response was to look round and say "Gentlemen, remember where you are." Lister never made inaccurate statements, and he told the speaker one day that he never wished to retract anything he had said or written. The legacy Lister left to mankind, concluded Sir Lenthal Cheatle, would be everlasting, and those who had felt his personal influence would also know that the place filled at his birth and left vacant at his death could never be filled by anybody else.

Colonel R. BOND, who came next to Sir Watson Cheyne as Lister's house surgeon, gave many personal reminiscences, and related how he, the speaker, carried the principles into the Sudan campaign and the Boer war.

Mr. HAMILTON RUSSELL, of Melbourne, said there had never been to his knowledge any who approached Lister as a dresser; as a dresser at the bedside he was supreme. Every action in Lister's daily life showed that he loved his fellow men; he had the philanthropic temperament, and would point out that when the patient was a child responsibilities were increased.

Mr. HOWARD P. WARD spoke of Lister's care in making his own gauze when he discarded his spray, and his skill in dressing wounds, which he never tired of doing himself.

Mr. L. VERNON CARGILL referred to the care the master inculcated in his students in thinking out every detail of a proposed operation.

Similar tributes were paid by Dr. H. DISTIN, Mr. H. PERRY, and Dr. A. BOUSFIELD.

THE PRIME MINISTER'S RECEPTION.

AT the reception held in the Great Hall of the British Medical Association on April 5th, the chair was taken by Sir Ernest Rutherford, President of the Royal Society, and delegates from 22 foreign countries and 62 British institutions were received by Mr. Stanley Baldwin, the Prime Minister.

Sir ERNEST RUTHERFORD said that it fell to few men in any age to leave behind them such a splendid and permanent memory as Lister had left. It was not necessary to be a specialist to realise what a debt the whole world owed to his discoveries and to his single-minded devotion.

He read congratulatory telegrams from the Imperial Academy of Tokyo and the State Institute of Experimental Medicine at Leningrad.

Mr. BALDWIN said that the boundaries of all the nations were broken down in that hall. Only 50 years ago Joseph Lister had come to London to convert his own people. At an International Congress in Amsterdam he had been greeted in words which might well be recalled to mind to-day: "Prof. Lister, it is not only our admiration which we offer you; it is our gratitude and that of the nations to which we belong." These words found their echo years afterwards on the lips of a great American Ambassador who, at a dinner of the Royal Society, said: "My Lord, it is not a profession, it is not a nation, it is humanity itself which with uncovered head salutes you." Such a gathering as this would not have been possible had it not been that in Lister were found all the complementary parts that go to make a man of real greatness. He had been a great master-workman in his own craft; he had brought more relief, more comfort to the human race than almost any man who had lived. But there was also the other side, the man himself. In Lord Lister were those very things which we must admire when we saw humanity raised to its highest point; he was a man truth-loving, truth-seeking and truth-living, gentle, filled with charity, a man with never a mean thought. These things were allied to supremacy in his own work.

Lister and France.

Prof. HENRI HARTMANN (Paris) expressed his pleasure at being appointed to convey the homage of the Académie de Médecine to the memory of Lister, one of its Associate Members. In the middle of the last century Nélaton had written: "A man who came forward with the means of abolishing purulent infection would deserve a statue of gold." French surgeons before Lister—Déclat, Lemaire, Maisonneuve and Demarquar—had used carbolic acid in the treatment of wounds, but with indifferent success. Lister had obtained his results because he built up his method on a scientific basis. Prof. Hartmann referred to Lister's practical application of Pasteur's experiments on fermentation, and to Lucas-Championnière's visit to Glasgow in 1868 and his subsequent battle for the establishment of the antiseptic method in France. His friends Berger, Périer, and Terrier had fought the good fight with him and their results had been so striking that soon, as it was said, "Lister was practised throughout France." A veritable revolution in surgery had followed. The discussions of the Société de Chirurgie had entirely changed after 1875; every surgeon had brought before its tribunal his astonishing and novel successes. Surgery continued to evolve; under the vigorous efforts of Terrier, asepsis had been substituted for antisepsis, and less importance was now attached to contamination by germs from the air. Nevertheless, everyone continued to follow the principles which Lister had established; the necessity of putting wounds beyond the power of germs which might contaminate them and the possibility of healing by first intention and of using buried ligatures.

Lister and Germany.

Prof. MAX V. GRUBER (Munich) said that the greatest successes in the prevention of disease were vaccination introduced by Jenner, the extermination of puerperal fever by Semmelweis, and the antiseptic treatment of wounds by Lister. Lister's work had also an enormous importance to intellectual development, as it was the fruit of theoretical insight. Prof. Gruber said that when a student he had seen what happened daily in an old-fashioned surgical hospital in the era before Lister. Some of the most prominent German surgeons, Bardeleben, Volkmann, and Nussbaum had been among the very first to appreciate to the full the value of antiseptic treatment, and Munich had been the first town to proclaim the immortal glory of Lister and to honour him as one of the greatest benefactors of mankind in 1875. Prof. v. Nussbaum had published a description of the method which according to Lord Lister's own words had contributed more to its rapid victory than any other publication. Under the banner of Lister surgery had made greater conquests within two decades than in two millenniums before. German surgeons had had a glorious share in that triumph. There was not much left of Lister's original methods at present. Many precautions had proved superfluous, others had had to be intensified. But his fundamental perception that wound diseases are infectious diseases had remained unshaken.

COMMEMORATION SERVICE AT ST. PETER'S, UPTON CROSS, ESSEX.

A service was held at St. Peter's Church, Upton Cross, on April 5th, to commemorate the birth of Lord Lister at Upton House, now St. Peter's Vicarage, on April 5th, 1827. The Bishop of Chelmsford preached the sermon and Sir Humphry Rolleston delivered an address which we print on p. 780. A procession to the church from the vicarage was formed, the Lord Provost of Glasgow, the mayors and medical officers of health of local county councils and boroughs, representatives of local hospitals and members of the medical profession taking part. The Rev. A. J. Parry, vicar of St. Peter's, has prepared a brief account of Lister's life and work, which was distributed to those attending the service.

RECEPTION AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

On the afternoon of Tuesday, April 5th, the President and Council held the Lister Birthday reception within the walls of the Hunterian Museum. A brilliant throng of foreign delegates and leaders of the medical profession from the Dominions overseas and from Great Britain and Ireland, with their ladies, were gathered soon after four o'clock in the Museums, Library and Council Room of the College, being received in the entrance hall by Sir Berkeley and Lady Moynihan and members of the Council. In Room I of the Museum the centre of interest was a display, arranged by the Conservator and Librarian, of the manuscripts, documents, and printed books contained in the Lister Memorial Cabinet, of which some account has been given in THE LANCET recently (March 12th, p. 553). Among the manuscripts priority should be given to the volume labelled by the late Sir Rickman Godlee "Notes and Drawings. Suppuration. Lister, 1851-1907." The folio lay open at the page where Lister in his own rapid and oft-corrected script had placed on record a detailed history of the first case in which the carbolic acid antiseptic dressing was used. The patient, a boy suffering from a compound fracture of the femur, was treated by Lister in his famous Glasgow Ward, in 1865, and though this first experiment proved unsuccessful—relatively so, for the boy does not seem to have died—it marked the beginning of antisepsis, being followed by operations of beautiful perfection. Close by this famous volume were also displayed Lister's wonderful drawings of fungi, while on a screen were hung Listerian diagrams illustrating the earliest test-tube experiments on bacteria, so carefully recorded by the great surgeon in his "Common-Place Books." Four volumes of these, now first shown in public, will continue to be one of the glories of the Hunterian Collection. One of the diagrams, which seems to have been used by Lister in his lectures, illustrates *Torula cerevisiæ* and *Bacterium lactis*, as also the bacteria found in urine. In the Conservator's room two drawings by Sir Rickman Godlee were shown illustrating micro-organisms in the pus of a newly opened abscess, first observed and recorded on May 20th, 1874. Other exhibits of supreme importance were Lister's own copy of *Palmer's Life of John Hunter*, with Lister's notes on two of the title pages, and a slim volume containing five letters from Lister's famous precursor, Louis Pasteur, who inquires, in 1874, concerning the exact nature of the bacteria which the distant Englishman has observed in wounds. Pasteur avers that he has long heard with interest of Lister's work, but reading between the (alas!) rapidly-fading lines of the great Frenchman's manuscript one cannot help surmising that he thought his English disciple somewhat hyperborean. Be that as it may, the little letter-book is without price. Sir William Watson Cheyne's work with Lister at King's College in 1878 is attested in this exhibition by a very interesting MS. of Lectures and by three charts, chosen from a number, illustrating the escape of blood from the jugular arteries of animals.

THE DINNER IN THE CITY TO THE DELEGATES.

On Tuesday, April 5th, a dinner was given by the Merchant Taylors' Company, in their famous Hall, to the Delegates assembled for the centenary celebrations. The function was presided over by the Master, Mr. A. L. F. Cook, and the company included, as well as a remarkable group of representatives of medicine in all its various branches and of science generally, the Lord Mayor of London, the Lord Provost of Glasgow, the Attorney-General, the Minister of Health, the Bishop of Birmingham, Sir William Lister, Sir Edmund Gosse, Sir George Frampton, Lord Chelmsford, and Lord Somerleyton. After the loyal toasts and the health of the Lord Mayor of London had been drunk, the company honoured in silence "the Memory of Lister."

The toast of the Delegates was proposed by Lord Crawford and Balcarres, who said that this was a recognition from all parts of the world of Lister's work in physiology and pathology. He pointed out that in the general fight against disease the advances that had been made during the lifetime of the Delegates had been vast and progressive, as displayed in the present position of scientific surgery and in what might be called the philosophy of the hospital. "We are proud," said the speaker, "to belong to an age in which the relief of human suffering has progressed so marvellously and scientific wisdom been so widely diffused." He wished the physicians and surgeons and pathologists associated with this progress all success.

The toast was replied to by Prof. J. N. Nicolaysen and Prof. Irving Cameron, delegates respectively, from Norway and Canada.

Prof. Nicolaysen, speaking with good command of English, expressed the thanks of the Delegates to the Master and Wardens of the Merchant Taylors' Company for their hospitality. "A common feeling," he said, "unites all present this evening in most profound respect to the memory of Lister, the great son of England whose centenary is being celebrated simultaneously by many of the most venerable institutions in Great Britain. Forty years ago I had the great honour and pleasure to be introduced to Sir Joseph Lister (as he then was), and to be present at his operations at King's College Hospital. You will understand the feelings of a young surgeon having for the first time an opportunity of seeing at work that hero of his science of whom he had read and heard from the beginning of his medical education. I do not know which I admired more, his noble geniality as a man or his thoroughness as an operator. This admiration for the great surgeon grew on me as, during the following years, I came to learn in a more detailed way of the scientific evolution of his labours; while I was strongly impressed by the fact that Lister's great discovery had been made, not in sudden inspiration, but was the result of close researches made during many years into the determining causes of inflammation and suppuration of wounds. And Lister's principles have stood the test. His system was taken up in its whole force, so to speak, during the great war though in a modernised form, when a modified aseptic surgery proved insufficient. Magna est veritas et prævalebit."

The toast of the Master of the Merchant Taylors' Company, was briefly proposed by Sir John Rose Bradford, who after testifying to the simplicity of the character of Lister and his tender feelings towards patients and pupils, referred to the fact that the Company, which was their host, had admitted Lister to honorary freedom. He said that while the Royal College of Physicians of London made special festival in honour of Harvey, and while the Royal College of Surgeons of England did the same by John Hunter, the City of London had, by conferring the Freedom, made Lister their own great scientific figure.

The proceedings of the dinner were accompanied by an excellent programme of music performed by the band of the Royal Regiment of Artillery, and by some delightful signing by the Gresham Singers.

MEMORIAL SERVICE IN WESTMINSTER ABBEY.

On Wednesday morning, April 6th, the centenary of Lord Lister's birth was commemorated by a service in Westminster Abbey, where he would have been buried but for his expressed wish. The large congregation was representative both of the sciences which his discoveries enriched and of the public which they served. The service opened with Addison's hymn, "The Spacious Firmament on High," and after the chanting of the eighth Psalm, the lesson was read from St. Luke vii. (verses 19–23). The choir then sang Handel's anthem:

> When the ear heard him, then it blessed him: and when the eye saw him, it gave witness of him. He delivered the poor that cried: the fatherless and him that had gone to help him. Kindness, meekness and comfort were in his tongue. If there was any virtue, and if there was any praise, he thought on these things. His body is buried in peace, but his name liveth evermore.

This anthem was the one sung at the memorial service to Lord Lister at the Abbey in 1912.

An address was then given by the Bishop of Birmingham, the Rt. Rev. E. W. Barnes, F.R.S., who called attention to Lister's personal qualities, to the religious principles which guided his actions, to the patient enthusiasm which served his genius, and to the inestimable value of his life-work. Lister belonged to that group of men whose achievements gave them a secure place in the history of civilisation. Throughout his life his work bore the stamp of humility: in a word, he possessed the true scientific spirit with the insight of genius. Praise and success in no way spoiled him, and in nothing did he show himself unworthy of the respect he had gained.

Whether through Lister's work discoveries of equal importance would be made in the future—whether we should be able to prevent the onset of disease, it was impossible to say; but there need be no hesitation in affirming that further triumphs in the warfare against disease would surpass the victories already won, for the achievements of the leaders of human progress gave substance to our hopes. Lister's single-minded devotion to science would inspire others to work for the welfare of the human race.

The service closed with the hymn, "Now thank we all our God."

THE CENTENARY AT GLASGOW.

The celebrations at Glasgow were held on April 1st. They began with a commemoration service in the Cathedral, to which the clergy, corporation, and academic representatives and delegates walked in procession. Sir Donald MacAlister, Principal of the University, read the first lesson and the commemoration address was given by the Rev. McLean Watt, Minister of the Cathedral.

A civic luncheon followed, at which the Lord Provost presided and Sir John Bland-Sutton proposed the toast of "The Illustrious Memory of Lord Lister." (His speech appears on p. 781 of this issue of THE LANCET). A second toast, "The Medical School of Glasgow," was given by Dr. A. Logan Turner, President of the Royal College of Surgeons of Edinburgh, who referred to Lord Lister's memory as a link between the Glasgow and Edinburgh Schools at which he worked. Sir Donald MacAlister spoke of the origin of antiseptic surgery at Glasgow, and Dr. R. M. Buchanan, President of the Royal Faculty of Physicians and Surgeons of Glasgow, giving the toast of "The Glasgow Corporation," referred to the application of Lister's principles to public health.

In the afternoon many representatives visited Kelvingrove Park and laid wreaths at the foot of the Lister Monument. In the evening there was a reception in the Bute Hall of the University, where Sir Donald MacAlister welcomed the guests and Sir Hector Cameron and Sir George Beatson recalled the character of Lord Lister's work as they had seen it. Other addresses were given by Prof. Irving, H. Cameron (representing the Royal Society of Canada), and Prof. Murdoch Cameron, the proceedings ending with a vote of thanks to the speakers, proposed by Prof. Archibald Young, who occupies the Regius Chair of Surgery in the University of Glasgow. Amongst those who attended the celebrations was Dr. W. G. Stevens, of Renfrew, who was present when Lister performed the first operation at which he observed antiseptic rules.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Lt. D. Duncan has been transferred to the permanent list.

ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Surg. Sub-Lt. L. D. Nelson to be Surg. Sub.-Lt.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. C. M. Row to be Temp. Capt., and relinquishes the rank of Lt.-Col.

Capt. (local Maj.) J. W. Malcolm relinquishes his local rank on ceasing to be empld. with the Iraq Levies.

ARMY DENTAL CORPS.

Temp. Lt. A. Hughes, Dental Surg., Gen. List, to be Lt., with seniority 25th May, 1925.

MILITIA.

Maj. E. S. B. Hamilton relinquishes his commn. and retains the rank of Maj.

TERRITORIAL ARMY.

Col. A. B. Soltau, K.H.P., to be Hon. Col., R.A.M.C. Units, 43rd (Wessex) Div., T.A.

Hon. Maj.-Gen. Sir Berkeley G. A. Moynihan, Bt., vacates the appt. of Hon. Col., R.A.M.C. Units, 49th (W. Riding) Div., T.A., on expiration of tenure.

Col. A. D. Sharp, K.H.S., to be Hon. Col., R.A.M.C. Units, 49th (W. Riding) Div., T.A.

Hon. Col. J. V. W. Rutherford vacates the appt. of Hon. Col., R.A.M.C. Units, 50th (Northumbrian) Div., T.A., on expiration of tenure.

Col. J. Clay, ret., T.A., to be Hon. Col., R.A.M.C. Units, 50th (Northumbrian) Div., T.A.

Officers Training Corps: Edinburgh University Contgt. (Med. Unit), Sen. Div.—2nd Lt. F. H. A. L. Davidson to be Lt.

INDIAN MEDICAL SERVICE.

Capts. F. Oppenheimer and Sundar Das Sondhi to be Majs.

Lts. Sukumar Dutta Gupta and D. MacD. Fraser to be Capts.

The King has approved the retirement of Lt.-Cols. S. Hunt and E. D. W. Greig.

Capt. Raghunath Bapuji Khare relinquishes his temp. commn., and is permitted to retain the rank of Capt.

Majs. Pheroze Kharsedji Tarapore, Dwarkanath Dhamaji Kamat, W. E. R. Williams, A. F. Babonau, and Sorabji Jamasji Bhathena to be Lt.-Cols.

Capt. U. J. Bourke to be Maj.

DISTRICT NURSING IN LONDON.—The main work of the Central Council for District Nursing in London last year lay in consolidating the nursing of London itself and in extending the service on the outer borders of the county. A new association was established at Eltham Hill on provident lines, and there has been considerable extension of work in Middlesex. The places where nurses are most obviously needed are the growing areas on the outskirts of London. Unfortunately the Council find that its invested funds are practically exhausted and, unless some new source of income can be found, the annual grants will have to be cut down severely. It is to be hoped that some way out may be revealed, as the value of the district nurse to the practitioner is only rivalled by her significance as a factor in public health and the prevention of disease.

Correspondence.

"Audi alteram partem."

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.

To the Editor of THE LANCET.

SIR,—There is evidence that what are termed generally philosophic studies would be of advantage to many medical men, both by expanding and defining their outlook in relation to general or individual experiences and by affording assistance in the solution of practical difficulties. The need for clear thinking was never more apparent than it is to-day, when our expanded range of knowledge adds constantly to a stock of exact information, the bearings of which cannot be confined to any one branch of science but make themselves felt in every field. "What is it all about?" is a question that every well-informed man asks himself when a mental problem, perhaps with a direct reference to action, presents itself to him in a form that is not dictated by his particular equipment. And the more well-informed he is, the more clear will it be to him that he needs fundamental guidance. In other words, he desires help in clear thinking.

The recently-formed British Institute of Philosophical Studies exists in order to afford this help to those who need it. The general object of the Institute is stated thus: "to bring leading exponents of various branches of philosophy into direct contact with the general—ublic with the purpose of satisfying a need, felt by many men and women in every walk of life, for greater clearness and comprehensiveness of vision in human affairs."

Medical men and women are to-day meeting many difficulties that are arising through the vast development of their science—developments of knowledge, of techniques and of administration; these are being accompanied by a broadening of view in their ranks, and also by a multiplication of the relations of medicine to society brought about by far-reaching changes in the law. The position must therefore often arise when medical men or women need clearness and comprehensiveness of vision. They would benefit by an opportunity of taking counsel with those in other sections of activity, who may be meeting their own problems from a different angle or who may be able to give an opinion on medical problems which gains in breadth and public influence from its detachment from medicine. Further, medicine by cooperation can confer on those other sections of activity the advantages of sharing considered medical opinion and of learning the arguments relied upon for its establishment.

Sociological and psychological questions arise constantly out of all medical practice, and not only out of those sides of medical practice apparently concerned with mental disease or moral conduct, while metaphysics must play a part in any comprehensive attempt to distinguish between normal and abnormal conditions, physical or mental—indeed between health and disease. A general philosophical equipment will be of great use to the practitioner as a supplement to all detailed scientific knowledge, for it will conduce to clear thinking.

For these reasons we advocate the claims, on members of the profession, of the British Institute of Philosophical Studies, the temporary offices of which are at 88, Kingsway. The Hon. Secretary would be glad to give any information desired. The subscription payable by members of the Institute is only £1 1*s.* per annum.

We are, Sir, yours faithfully,

(Sgd.) DAWSON OF PENN. THOMAS HORDER.
HENRY HEAD. T. W. MITCHELL.
WILLIAM BROWN. H. CRICHTON-MILLER.

88, Kingsway, London, March 31st, 1927.

TESTS FOR DRUNKENNESS.

To the Editor of THE LANCET.

SIR,—A great deal of interest has been aroused in the question of the insobriety of motor-drivers by numerous police-court cases which have been commented on in the press, and have often been the subject of conflicting evidence and appeals. Recently the British Medical Association appointed a Committee to inquire into the tests for drunkenness. Their results have now been published.[1]

The Committee's recommendation for a new legal definition of drunkenness is one which will be commended by all who recognise that a man need not be grossly intoxicated by alcohol to render him unfit to be in charge of a car. This point was stressed in a pamphlet published early in 1926 by The True Temperance Scientific Committee, under the title, "The Problem of the Intoxicated Motor-Driver."

Coming now to the tests for drunkenness which the Committee favour, one doubts whether commendation will be as uniform, for of the various tests suggested, foremost rank is given to the test of smelling alcohol in the breath or vomit; than which one ventures to suggest, a more unscientific test could not be found for the following reasons.

1. The concentration of alcohol in the exhaled breath is much more a function of the *rate* of blood supply to the lungs than it is to the concentration of alcohol in the blood. Consequently an accused, intoxicated to the stage of restlessness, may through his active movements be actually exhaling breath containing a greater concentration of alcohol than one dead drunk whose respirations are slow and shallow.

2. The application of the sense of smell is an uncertain method of analysis. Not only does this sense vary enormously between individuals but also in the same individual. The effect of a cold on the sense of smell is a by-word. Also one wonders how the examining police surgeon's olfactory sense will react if he himself has had alcohol previously with his dinner? The Committee naively point out that the success of the olfactory method of diagnosis depends on the keenness of the sense of smell of the individual applying the test!

One ventures to think that the Report is an unhappy effort to deal with the subject. It is a step backwards, for to urge the usefulness of the sense of smell in this connexion means nothing else. That senior police surgeons, many of whom are quite satisfied with the present day tests for drunkenness should favour this particular test, is not surprising, but that an analytical chemist and toxicologist of Sir William Willcox's standing should also subscribe to it is beyond one's comprehension.

This is a subject in which the present writer is keenly interested, because he has been carrying out experimental work during the past four years which bears directly on this difficult problem. Some results of this work were embodied in a paper by Drs. Southgate and Carter,[2] who showed that from an analysis of the alcohol in the urine not only could the concentration of alcohol in the blood (the best index of intoxication) be deduced, but also a close approximation of the least amount of alcohol which had been drunk. The British Medical Association Committee, whilst acknowledging the great value of this work from a scientific point of view, maintain that tests depending on the examination of the urine are not practicable. Why it is not practicable to examine the urine is not stated. Is the difficulty a legal one? One cannot conceive why the police surgeon has a right to examine the excretions from the lungs, or a return from the stomach, and yet none to analyse the excretions from the kidneys. The impracticability cannot depend on difficulty of analysis, for an accurate analysis of alcohol in the urine can be carried out by any competent analytical chemist in half an hour.

[1] Summarised in Brit. Med. Jour., Feb. 19th, 1927.
[2] THE LANCET, 1926, i., 207; Brit. Med. Jour., 1926, i., 463.

In their paper, the two authors referred to only asked that the results of their work should be corroborated by others. This the British Medical Association committee has denied them. If this committee had organised a similar set of tests on the human subject and compared the results of the amount of alcohol drunk, the resulting concentrations of alcohol in the blood and urine, with the toxic symptoms produced, one ventures to think they would agree that anyone, whether accustomed or not to alcohol, with a blood alcohol concentration of 200 mg. per 100 grammes of blood, corresponding to about 260 mg. in the urine is quite unfit to be in charge of a motor-car.

I am, Sir, yours faithfully,

Croydon, March 24th, 1927. H. W. SOUTHGATE.

THE PENALISATION OF THE TUBERCULOUS.

To the Editor of THE LANCET.

SIR,—The letters which have appeared lately under this heading are of such great human interest, especially that of "Eradication," that I feel bound to crave space for a few words on this unusual view-point of after-care. They express sentiments which go deep down into the well of human nature. They fathom the deeps of Life's ocean. It is the cry of the wounded to be given a chance; a cry, not for charity, but for work. It is almost a universal cry. In these two letters we hear it from members of the medical profession. This is not usual. If we listen we may hear it from members of other professions, from members of the legal profession, from nurses and teachers. The cry increases as the economic strain becomes greater, until from the black-coated clerk and those beyond the dole, it becomes the cry of the multitude. And the cry is incessant.

Those of us who are employed in the tuberculosis field but who are not ourselves sufferers cannot fail to have been struck with the seriousness of the question which "Eradication" addresses to you, Sir. "And if they are debarred from getting employment, what is the use of treating them?" and if we have no answer to that question, what is our position? How are we to answer the question: "If tuberculosis authorities will not employ their ex-patients, who can be expected to do so?"

From one who has had the misfortune to contract the disease, and who has had the still greater misfortune to be denied employment as a sanatorium physician, the cry "What is the good of treating them?" comes as a poignant appeal. We feel he is our own kith and kin. To be turned down for a job—the grossest penalisation. But it is happening every day to a far greater extent amongst all those who do not belong to the medical profession. We hear little of the penalisation in such cases. Why? Because, as a profession, we have never answered, indeed, never faced the question fairly: "And if they are debarred from getting employment, what is the use of treating them?" Medical men who have suffered from pulmonary tuberculosis have in many cases, as "Eradication" points out, found in sanatorium work an environment in which their work can be made to suit their damaged condition. They have, as I have pointed out elsewhere, found an equilibrium. But it by no means follows that the work in every institution is light enough for the damaged organ. It emphatically is not in many cases, for breakdowns are frequent, and, indeed, deaths are not unknown.

But it is not my present object to discuss whether a tuberculous medical man is the ideal medical officer for a sanatorium. Faith in the cure may not be entirely lacking in the healthy, however depressing sanatorium statistics may be. But of far greater importance is the determination to see that "if tuberculosis authorities will not employ their ex-patients" *then someone else will*, and that "if they are debarred from getting employment (even as a medical man in a sanatorium), they shall be found remunerative employment in an environment best suited to their condition. Such an environment I saw last summer at Saranac Lake, such employment for medical men which makes it impossible to speak of the penalisation of the tuberculous, and I look forward to the time when Papworth will provide similar opportunities. When we can answer the question: "What is the use of treating them?"; when we can be quite sure that we have the right answer, and not the half-answers usually given, then, and only then, will the penalisation of the tuberculous cease.

"Eradication" is too modest. Not only should tuberculous medical men combine in an attempt to "cure themselves with an appointment," but they should see to it that all those who have taken the trouble to get well combine also. Let us attempt to make it possible for all who have taken the trouble to get well to cure themselves with an appointment—in other words, provide efficient after-care.

"To cure ourselves with an appointment" should, indeed, be the slogan of the future for the tuberculous.

I am, Sir, yours faithfully,

P. C. VARRIER-JONES.

Papworth Hall, Cambridge, March 28th, 1927.

ANÆSTHETIC ETHER.

To the Editor of THE LANCET.

SIR,—The recent remarks by the Southwark coroner, Dr. F. J. Waldo, on the desirability of the use of absolutely pure ether for the production of anæsthesia has focused attention again on this important matter, and a review of the position at this stage seems to us to be indicated.

Some ten years ago the necessity for purity in ether formed the subject of a controversy which lasted over a period of years. It started in 1917 with a claim made by J. H. Cotton [1] that by the purification of ether he had deprived it of its anæsthetic properties. In view of this he attributed the anæsthetic properties of ordinary ether to the presence of ethylene and carbon dioxide. Four years later Wallis and Hewer [2] implied that they, also, had found that pure ether possessed no anæsthetic properties, adding that its function was that of a vehicle for the "anæsthetic compound," the principal constituents of which were certain ketones. As a result of this they advocated the addition of ketones to ordinary ether to increase its anæsthetic properties. This remarkable publication led to a careful investigation by several workers of the anæsthetic action of ether, and to a study of the physiological action of the impurities which are commonly found in commercial ethers.

In a paper published in 1923 Dale, Hadfield and King [3] disposed conclusively of the view that perfectly pure ether was not a good anæsthetic. These workers prepared a quantity of ether and purified it by repeated fractionation, washing it with caustic soda and water, boiling with potassium permanganate, refractionating, and drying first by calcium chloride and then by metallic sodium and refractionating again. By this long and careful process of purification they prepared an ether which distilled between 34·1° C. and 34·15° C. at 751 mm. This ether they regarded as free from aldehydes, ketones, acids, mercaptans, alcohol and all other known impurities, including ethylene. The pure ether was then tested on animals by Dr. Dale, and on human beings by Dr. Hadfield; and the results proved that it was in every way a perfectly satisfactory anæsthetic. The ketone theory was reduced to an absurdity by this careful and authoritative work.

The next step taken was to investigate the physiological action of impurities in anæsthetic ether, and in March, 1924, Prof. Storm van Leeuwen [4] of Leyden read a paper before the Anæsthetic Section of the Royal Society of Medicine (in London) in which, in addition to confirming the opinion of Dale, Hadfield

[1] Cotton: Jour. Can. Med. Assoc., September, 1917.
[2] R. L. M. Wallis and C. L. Hewer: THE LANCET, 1921, i., 1173.
[3] H. H. Dale, C. F. Hadfield and H. King: Ibid., 1923, i., 424.
[4] Storm van Leeuwen: Ibid., 1924, i., 561.

and King regarding the anæsthetic properties of pure ether, he stated that of all the commercial ethers which he had examined none was chemically pure. He then described a method which he had evolved for preparing an absolutely pure ether, which consisted of a process by which ether was made to combine with benzidine to form a crystallised double salt. This double salt could be readily purified, and after purification decomposed into its component parts. The ether made in this way was absolutely pure, and, unlike all the commercial ethers which Prof. van Leeuwen had examined, was perfectly stable. It was established also that absolutely pure ether could not be made by redistillation alone, but that a chemical method also was necessary.

A few months later a paper was read at the British Pharmaceutical Conference by G. Middleton,[5] of the laboratories of The British Drug Houses Ltd., and in this paper a delicate test for the detection and quantitative estimation of peroxides present in anæsthetic ether was described. The paper contained, also, a report on the determination of the stability of various ethers, and from the data given it was observed that ether purified from aldehyde is much less prone to oxidation and to the formation of peroxides than any ether not so purified. Following these researches it came to be more clearly recognised that the presence of impurities in ether causes deleterious effects after administration, and, more recently, several investigators have provided additional evidence of this view. For instance, J. Mita [6] has demonstrated experimentally what had been repeatedly indicated as a result of the general observations of anæsthetists and others, that the toxicity which develops in ether increases proportionately to the degree of oxidation by exposure to light and air; and he showed that oxidised ether, in addition to producing local and necrosing effects, had very distinct actions on the heart and the central nervous system. He attributed these toxic phenomena to the peroxides first obtained from ether by Wieland.

In October, 1926, the Anæsthetic Committee appointed by the Royal Society of Medicine issued an interim report in which it was stated that "the purer the ether the better the anæsthetic." Also, in a paper read before the anæsthetic section at the recent annual meeting of the British Medical Association Dr. F. H. McMechan [7] said:

> "Certain impurities in anæsthetics may merely involve disagreeable odours or tastes; others may be responsible for nausea and vomiting; while still others may induce pathological conditions leading to endangering complications or even death. As most of these are effective when present in traces represented by percentages in the second to the fourth decimal places, their absolute elimination is imperative."

It was clearly the duty of manufacturers to act in accordance with this new knowledge as to the importance of purity in anæsthetic ether, and one of them in particular, The British Drug Houses Ltd., introduced a more highly purified ether, free from all traces of aldehyde and peroxide. This pure ether is packed and issued in light-proof packings under conditions which preclude the possibility of the formation of peroxide, thus permitting its arrival in the operating room in a perfectly pure condition.

The importance of the light-proof packing is due to the fact that, while pure ether is very much more stable to light than less pure ether, it undergoes very gradual change if allowed to stand in the light. If to a bottle of pure ether there is added some stale ether which has been exposed to light the whole quantity will be rendered unstable. When using the closed method of administration (Shipway) oxygen or air is bubbled through ether in a bottle which is usually of colourless glass. Consequently during the administration impurities are formed in the apparatus. If the practice is followed of adding fresh ether to the surplus left over from the previous operation there accumulates in the apparatus a highly concentrated solution of impurities. Each addition of pure ether, therefore, merely dilutes this solution; with the result that what is administered to the patient is an impure mixture. The longer the surplus ether is allowed to accumulate in the apparatus the worse is the effect. It is important, therefore, that this residual ether should be thrown away after each operation, so that any fresh ether transferred to the apparatus may not become harmfully contaminated. For the same reason the contents of the apparatus should not be mixed with any ether which is likely to be subsequently used for anæsthetic purposes.

Very little extra expense is involved in taking these precautions, indeed highly purified ether is now made on such a large scale that the makers have reduced the price to about the same as that of other ethers; at the same time it should be emphasised that the advantages resulting from the absence of toxic effects far outweigh any possible considerations of price. Dr. Waldo has done a great public service in directing attention to the dangers resulting from the use of impure ether, and his suggestion that an analyst's certificate of purity should accompany all anæsthetic ether should be strongly supported by enlightened opinion with the object of securing its legal enforcement.—I am, Sir, yours faithfully,

April 2nd, 1927. H. E. LAWS.

[5] G. Middleton: Pharm. Jour., July 26th, 1924.
[6] J. Mita: Jour. de Pharm. et Chem., 1926, iii., 67.
[7] F. H. McMechan: Brit. Med. Jour., 1926, ii., 1106.

OPHTHALMIC BENEFIT.

To the Editor of THE LANCET.

SIR,—I was simply astounded at Mr. Caddy's letter, and must express my full agreement with the replies from Mr. Lumsden and "F.R.C.S., Oculist." Allow me to point out a few fallacies in the working of this scheme. Previous to the adoption of ophthalmic benefit, the approved societies were accustomed to pay the opticians a testing-fee of 5*s.* or more, and some of the societies continue to do so for every insured patient. May I ask why this fee is necessary when no optician demands this fee from the public?

In spite of the doctor recommending that his patient should be examined by an ophthalmic surgeon some societies send the patient direct to the opticians. To my mind this shows a disregard for the patient's sight and is insulting to the doctor. I think I am right in stating that it is intended that the doctor (and not the optician) who is expected to decide as to what cases should go to the ophthalmic surgeons. In my opinion the doctor is placed in an extremely difficult position and the responsibility is too great. Mr. Caddy seems to think it is enough to pick out the cataract, new growth, and glaucoma cases. My extensive out-patients' experience has taught me that a fair percentage of really serious medical cases attend all ophthalmic clinics. Let me mention a few types—e.g., patients suffering from arterio-sclerosis, diabetes, renal disease, hemianopia, retinal hæmorrhage, encephalitis lethargica, optic neuritis, &c. In a proportion of these cases it is surprising how little the visual acuity is affected, and the doctors were not aware of the condition at the time. It was the ophthalmic surgeon who had diagnosed the actual disease. If this is so, here we have a large number of serious cases not recognised by trained medical men. Surely, then, a tradesman with no medical training is less likely to recognise these cases and appreciate their seriousness.

If I were an optician I should hardly like to assume such grave responsibility. One's sight is much too precious, and although 5 per cent. (I think it is more like 20 per cent.) of the cases are involved and because these are panel patients, I think it is criminal to jeopardise the sight of even 1 per cent. of this total.

It will be detrimental to the public interests to have opticians meddling with the work of the ophthalmic surgeons and vice versa. Remember we do not sell glasses, and all prescriptions for glasses go back to the opticians. Why do they seek for this

extra and grave responsibility? Have we not all had experience of patients being sold two or three pairs of glasses when only one pair or none was necessary? Similarly, there is the wholesale abuse of forcing the public to buy Crookes's lenses. No, the optician should only dispense our prescriptions and sell other optical goods, and this is the only safeguard for the public. No one denies that there are opticians who are competent to do refraction cases. But I should like the majority to concentrate on *dispensing a prescription accurately and on fitting the frames correctly*. This is their job, and it is really surprising how few know it apart from the class of dispensing opticians. It is quite true the bulk of an ophthalmic surgeon's work is to prescribe glasses, and it is the same for private and hospital work. If 80 per cent. of the work—i.e., refractions of panel patients are referred to the opticians according to Mr. Caddy's wish—I wonder if he will also send similar cases in private to the opticians and only deal with those suffering from ocular diseases. If the public can afford our fees they will do so every time, and I need not state the reasons for it. Why should not the panel patient be accorded the same privileges if his society can afford a reduced fee?

The only sound way to deal with every eye case, whether private or panel, is for the doctor to send such cases direct to an ophthalmic surgeon, who will assume full responsibility. Sight is much too precious to be tampered with by unqualified men; and even the ophthalmic surgeon finds it difficult sometimes to make a diagnosis. Ophthalmic benefit is for panel patients who are free to choose their doctors; similarly, they must be allowed to choose their ophthalmic surgeons. Let us not depart from this principle.

I am, Sir, yours faithfully,

J. MYLES BICKERTON, B.Ch. Camb., F.R.C.S. Eng.,
Dean of Royal Eye Hospital.

London, W., March 29th, 1927.

To the Editor of THE LANCET.

SIR,—Dealing with the various points raised in the last letter (the only unsigned one) under this heading in your issue of April 2nd, may I say that from my own experience of the Acts that have been passed in the 47 States of America, in Canada, and in Australasia, and based upon authoritative information, such legislation has proved to the benefit of the spectacle-wearing public and of those who have diseases of the eye which would have remained undetected but for the findings of the skilled optician.

Secondly, it is not true that the various optical organisations are on terms of bitter enmity. There are only two recognised examining bodies in England, the Spectacle Makers' Company and the British Optical Association, and they work in perfect friendship with each other. Although there are only these two recognised bodies, there are other important bodies of opticians, such as the National Council for the Preservation of Eyesight, the Institute of Ophthalmic Opticians, and the Association of Wholesale Manufacturing Opticians, all of which work in perfect harmony with each other. As is inevitable, not only with unregistered professions, but even with State-recognised callings, there are springing up, especially in view of imminent legislation, mushroom societies, and certificates which may be bought with little trouble. It is but natural that such new societies should be at variance with the others, and plead from time to time in the press for equality and broad-mindedness. It is the obvious view-point of an individual without property on the question of equal division of property. The Joint Council of Qualified Opticians is a body with a special licence from the Board of Trade to dispense with the word "Limited," on account of its not giving any profit to its members, and because it is a body formed for a scientific or charitable purpose. It could not be described as a limited company. The entrance fee to the J. C. Q. O. for a qualified optician is nominal—only 5*s*. It is not correct to state that any further percentage beyond the ordinary two-and-a-half per cent. for ordinary administrative expenses is deducted. The J.C.Q.O. has nothing whatever to do with any eagle or any advertisement, and your correspondent is confusing this society with another body.

Thirdly, the nominal testing fee of 5*s*. is allowed to an optician in all cases where he finds glasses are not required, and it is this very allowance in such cases, and the severe ethical discipline exercised over its members, that induced the major Approved Societies at its inception to place their work unreservedly through the clearing-house of the J.C.Q.O.

Fourthly, the optician does not advertise or prescribe spectacles to the public as a "cure-all." I am quite certain that if such an advertisement came before the notice of my Executive, the perpetrator would be immediately hauled up for infringement of its code of ethics.

Fifthly, with regard to a very serious charge that your anonymous correspondent makes, that relating to the mistakes of opticians, he is generalising from three of his own cases. Within a week ago, anticipating similar unsportsmanlike attacks, I wrote to our members of the J.C.Q.O. asking them to give me any evidence that they could at short notice in the following clauses: 1. Evidence of errors in diagnosis by medical men. 2. Cases of patients requiring ordinary lenses being specially referred by medical practitioners to ophthalmic surgeons. 3. Evidence to shew that medical men are referring cases to them as optical practitioners. Within two posts I received over 200 bulky envelopes in reply to my request. The task of sorting these is obviously going to be so great that I have not even opened the envelopes. But your correspondent may find that the unsportsmanlike attitude he adopts will only come back as a very powerful boomerang.

Sixthly, your correspondent says that the average optician devotes too much attention to the commercial side, and in contrast mentions the Association of Dispensing Opticians. But the members of this body, for which I have every respect and esteem, do not test sight, and therefore, as is but right, their businesses are purely commercial, with every desire to give good value and service for money, but still commercial.

Lastly, your correspondent makes the absurd statement that anyone can acquire sufficient knowledge in ten hours to call himself a fully qualified optician. I am enclosing the syllabus of our B.O.A. Examinations, where you will see a curriculum such as will take an average intelligent man from two to three years to prepare for.

One realises that there are two sides to a question, and that each side may think it is right; but one would like to see such a campaign carried on with regard to truth and with an absence of personalities.

I am, Sir, yours faithfully,

J. H. SUTCLIFFE,
Registrar of the Joint Council of Qualified Opticians;
Secretary of the British Optical Association.

Clifford's Inn Hall, Fleet-street, E.C., April 2nd, 1927.

To the Editor of THE LANCET.

SIR,—In the letter signed "Ophthalmic Surgeon," which appears on page 729 of your last issue, there is a reference to the Joint Council of Qualified Opticians, in which the statement occurs that "the insurance companies allow a testing fee of 5*s*. to the optician for every case for which spectacles are supplied." Evidently the writer is not familiar with the facts, as the consultation fee of 5*s*. is paid in every case where the patient is examined by the optician, whether the patient is referred for medical advice or not, and has no relation whatever to the supply of spectacles.—I am, Sir, yours faithfully,

F. T. GREGG,
Secretary, Institute of Ophthalmic Opticians.

Bank Chambers, High Holborn, W.C., April 2nd, 1927.

Public Health Services.

SCHOOL MEDICAL SERVICE.

AMONG the first annual reports to be presented are those of Ilford, Taunton, and Torquay. Some of the statistical details of these are indicated below.

Name of district.	No. on roll.	Av. elem. school attendance.	No. of routine children examined.	No. of special examinations and re-inspections.	Percentage of children found on routine examination requiring treatment.*
Torquay ..	3,775	3,371	1,274	5,510	19·0
Taunton ..	2,909	2,681	1,038	2,936	26·8
Ilford	13,144	—†	5,658	8,964	42·1

* Excluding uncleanliness and dental defects. † Not given.

Torquay.

The school medical officer, Dr. T. Dunlop, in his introduction, is able to say that there is no child in the Torquay schools with defective vision untreated and that practically all spectacles prescribed have been obtained and made use of. Dr. J. V. A. Simpson points out in his detailed report that this ophthalmic work, like the other treatment facilities of the school clinic, is available for children of pre-school age. The chief factors which produce defects in school entrants are thus stated: (1) Irregular feeding, (2) irregular hours of sleep, (3) infectious diseases. An account is given of the open-air school which is not regarded as "merely a school in the open air." An appendix contains a further series of Dr. Simpson's observations with the kata-thermometer; the time taken to fall from 100° F. to 95° F. is taken as a measure of the cooling and evaporative powers of the air. According to Dr. J. Kerr this instrument "has added enormously to the power of examining the air in respect of ventilation as it integrates all effects, positive and negative, giving a result concordant with the ventilation effects on the body." Dr. Leonard Hill's minima of 6 for the dry and 18 for the wet reading are regarded by Dr. Simpson as too low; he would prefer the figures of 7 and 20 respectively. The detailed figures he gives do not in general reach this high standard; they do indicate, however, that though the buildings may not be ideal, the ventilation is, on the whole satisfactory. In several of the best examples there is a comment "open fires," and in one of the worst "window shut, cord broken."

Taunton.

Dr. John Allen, in his eighth annual report, notes with pleasure the supersession of the antiquated long desk by the new single type, but deplores the retention of some insanitary latrines. Although in some cases the attendance has fallen below 60 per cent., owing to mumps and German measles, no school or department has been closed. There has been a rapid rise in the percentage of children requiring treatment—from 10·1 per cent. in 1924 to 26·6 per cent. in 1926—due, of course, to an all-round raising of the standards. Supervision of pre-school children is included in the maternity and child welfare scheme and the records are available for the school medical officer. The orthopædic scheme in conjunction with the Somerset County Council is now working well, and a strong voluntary committee is providing useful help; 2·1 per cent. of the children were classed as cripples and found to be in need of this treatment. This percentage is considerably in excess of the average for England and Wales, but it should be borne in mind that the initiation of a scheme implies a careful look-out for every child in need of orthopædic treatment. The Somerset Association for Mental Welfare have an occupation centre for low-grade defectives which is held in the rooms of the local Y.M.C.A. and is open three days a week.

Ilford.

With the rapid growth of the population at Ilford and the inclusion of Dr. Barnardo's Mossford School for Girls under the direct control of the local education authority, many more school-children were examined during 1926 than in former years. Dr. A. H. G. Burton regrets that the open-air school, the site of which was approved by the Board of Education in 1924, is not yet in being, nor is there as yet any special provision for mentally or physically defective children. Two interesting tables are given comparing the incidence-rate per 1000 of crippled and defective children in Ilford with that for the country as a whole. The figure for crippled children in Ilford is 1·7 against 10·0 for England and Wales. The Ilford analysis, however, includes only those children who are so physically defective as to be unable to attend school, or who should be in attendance at a special school. This way of stating the figures is misleading in that it tends to lessen the apparent urgency for special provision for such children; it is in the minor and progressive cases that special treatment is most called for and on which attention should be focused. Were he to give the total numbers Dr. Burton would strengthen his urgent request for a remedial clinic for minor defects; in the meantime all minor deformities receive special attention from the supervising instructor in physical training. The high standard of visual acuity demanded is shown by the incidence-rate per 1000 of visual defects in Ilford, 77·0 against 54·7 for England and Wales. All minor defects even in those reading 6/6 Snellen's type are referred to the oculist. The standards adopted for operative treatment for adenoids are "chronic nasal obstruction or where adenoids can be felt digitally." For tonsils "where this condition has been keeping up such defects as otorrhœa, deafness, and frequent attacks of tonsillitis." Statistical tables show the heights and weights of Ilford children compared with the anthropometric standards, and also the school incidence of infectious diseases.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 26TH, 1927.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 404 (last week 442); scarlet fever, 1292; diphtheria, 974; enteric fever, 54; pneumonia, 1373; puerperal fever, 39; puerperal pyrexia, 109; cerebro-spinal fever, 13; acute poliomyelitis, 5; acute polio-encephalitis, 1; encephalitis lethargica, 37; dysentery, 15; ophthalmia neonatorum, 146. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In the aggregate of great towns including London there was one death from small-pox, 1 (0), from enteric fever, 71 (2), from measles, 6 (2), from scarlet fever, 89 (22), from whooping-cough, 35 (11), from diphtheria, 51 (16), from diarrhœa and enteritis under two years, and 224 (33) from influenza. The figures in parentheses are those for London itself. The death from small-pox was registered in Sheffield C.B.

BIRMINGHAM HOSPITALS.—According to the annual report of the Queen's Hospital the new extension will be completed in a few weeks and, very little later, when the present surgical block has been renovated, the hospital will have added nearly 100 new beds to its normal establishment, thus reducing the serious scarcity of beds in the city.—Although it contains only 116 beds the Women's Hospital and Maternity Hospital last year dealt with the "record" number of 2443 in-patients. The average daily cost per patient was 9*s.* 6*d.* Extensive antenatal work is also being done.—The Birmingham Hospital Saturday Fund likewise achieved a "record" by raising over £65,000 last year. The great increase in applications for convalescent treatment, especially for men, is compelling the enlargement of the Tyn-y-Coed Home by the addition of 60 beds, which will bring up the number to 125.

Special Articles.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Compulsory Insurance for the Medical Profession.

THE amended law on medical chambers contains the provision that a chamber may establish an insurance institute, membership being compulsory for every medical man or woman residing in its district. The money may be collected by contributions from the profession. The Berlin Medical Chamber, which includes Berlin, the Province of Brandenburg, and those parts of Posen and Western Prussia which are still under German rule, lately suggested the establishment of an institute for life assurance; the contributions were to be 60 per cent. of the State income-tax and the insurance allowance was M.1200 (£60) per annum in case of invalidity or after the age of 70, and M.600 for widows and M.480 for every orphan. This scheme caused much discussion in medical circles; it was argued that the tax raised by the Berlin chamber was already rather high, and the proposed contribution would considerably increase it, whilst the benefits were much smaller than those which could be got from private insurance companies. In view of growing opposition the Chamber, although authorised to take action as it wished, resolved that the medical profession in the district should vote on the proposal. The result was that compulsory insurance was rejected with an overwhelming majority. Of 5100 voters only 800 were in favour of it; 2500 were opposed, and 1800 abstained from voting. The Democratic Party of the Reichstag has moved that State insurance shall be instituted for the legal, medical, and pharmaceutical professions and for artists and literary men. It is pointed out that the great majority of people in these professions have lost their savings by inflation of the currency and that they and their families may become a burden to the ratepayers if unable to work. Compulsory State insurance of the medical profession exists already in Bavaria where it is said to work satisfactorily.

Pre-matrimonial Advice.

A report has recently been issued by Dr. Raecke on the work done by the Matrimonial Advisory Office of Frankfort-on-Main. Engaged persons applying to the office were examined concerning the health of their families and on their own bodily and psychic condition, especially for the presence of venereal disease or sexual anomalies. As regards heredity, it was difficult to get positive answers; 36 per cent. of the individuals examined were unable to give any answer at all, and the great majority of the others could only give incomplete replies concerning the health of their relations and forbears. It also proved very difficult to ascertain the psychical condition of the people who came to the office; epilepsy, for instance, could not be detected in the consulting room. Sexual anomalies and venereal diseases were often concealed, whilst many of the candidates declared that they had only come at the request of their parents and asked for a certificate which could not, of course, be given to them without investigation being made. The work of the office has not led to the results anticipated by some medical men and by the public (THE LANCET, 1926, i., 881). It has had, however, a limited usefulness in that it appeals to the conscience of marriage candidates and sometimes appeases the anxiety of hypochondriacs.

Early Days of Vaccination in Germany.

It is now 125 years since the foundation of the State Institute for Vaccination, as has lately been pointed out by Prof. H. Gins in a paper read before the Berlin Society for the History of Medicine. The first vaccination in Germany was performed as early as 1799 in Hanover. Berlin followed in 1800 when Dr. Heim, who was the leading practitioner in the city at that time, used vaccine received from London. The good results which he got were recognised by the Royal Department for Public Health, and a public institute for vaccination was established in 1802 in connexion with the public orphan asylum, where it was arranged that two children with cow-pox should always be at the disposal of medical men. At that time vaccination was not, of course, compulsory, and pamphlets were distributed to the public on behalf of the institute in order to make it popular. In course of time calf lymph was introduced and soon the institute was able to collect up to 10,000 doses of vaccine from a single animal.

An Exhibition on Quackery.

In connexion with a meeting of the German Society for Combating Quackery an interesting exhibition has been held to show the methods of quacks, their advertisements, and their organisation. The methods of scientific medicine, the length and intensity of medical study were compared in statistical tables with the six weeks' training advertised in certain papers for intending quacks. The State library contributed to the history of quackery by exhibiting old documents in which the cities, universities, and rulers of Germany had warned the public against quacks, and had issued regulations designed to render them innocuous.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Aberdeen Joint Hospitals Scheme.

IN a previous letter (THE LANCET, 1926, ii., 873) I described the arrangement by which the municipality was to take over the Poor-law hospitals of Aberdeen. This plan has been delayed, and Prof. Matthew Hay's original Joint Hospitals Scheme has now emerged upon a new plane. One of the difficulties of this scheme was the disposal of the old buildings of the Royal Infirmary, but the Lord Provost of the City has now launched a public appeal for £400,000 to enable the infirmary to surmount this difficulty as to the old buildings, to secure that adequate new ones can be built, and to increase the endowed income in correspondence with the enlarged accommodation. It is announced that about £200,000 has been promised already, but as the cost of the Royal Infirmary part of the scheme is estimated at £300,000 there is still £100,000 to be found, besides what is needed to maintain the proportion of endowment income to ordinary revenue.

When the Joint Hospitals Scheme was originally announced, opinion was very much divided: but, just as in the case of the extension of the Marischal College over 30 years ago, Prof. Hay was satisfied that ultimately the whole community would be be won over to it. And now it seems that the Hospital Scheme has really become practical politics. It includes, it will be remembered, not merely the new Royal Infirmary, but also the new Sick Children's Hospital (already nearly complete), the new Maternity Hospital (funds already almost adequate), the Tuberculosis Sanatorium (provided by the city), and pathological and teaching accommodation (provided by the University).

Whatever be the forces that have ended in the launching of this appeal, the supporters of the voluntary principle may congratulate themselves on the fine response for the Infirmary section. But, of course, the total scheme includes the Municipal Sanatorium, the Municipal Maternity Home, the Municipal Hospital partially maintained by the municipality, and possibly one or two other elements subsidised from rates or grants. There remain also the other three large medical problems: the institutional treatment of infectious diseases, including the pneumonias and others until recently treated in

non-municipal institutions; the institutional treatment of the sick poor, who must *all* be treated according to their needs and numbers, and the institutional preventive treatment of young children from infancy to the end of the school age. These problems all have points of contact with the Joint Hospitals Scheme, and it will be interesting to watch their final adjustment. As has been frequently pointed out, the municipality and the parish council have no power to select their patients or to adjust their numbers to accidental conveniences of any kind. They must provide for all patients in need of treatment. This fact marks the limits of the so-called voluntary principle. It also demonstrates that however great the voluntary contribution to hospital service may be, it is never in any danger of outrunning the necessities. There is always more than enough work both for the voluntary hospitals and for those supported out of the rates.

MEDICINE AND THE LAW.

Alleged Negligence in Certification under the Lunacy Act: Abortive Action.

A WEEK after the Hume-Spry action had come to an end, yet another claim was heard in the High Court, in which a plaintiff alleged negligence on the part of a medical practitioner who had certified insanity. The claim was that of Mrs. de Freville, of Wokingham, Berkshire, against Dr. A. V. Dill, of Brinscombe, Stroud, Gloucestershire. She alleged that on June 9th, 1926, when she went to Oakridge Vicarage, Stroud, to join her husband at the home of her father-in-law, her husband ejected her forcibly from the house, and that, when she obtained entrance through the servants' door, her husband and her father-in-law kept her in the servants' hall till Dr. Dill arrived. She was taken to the Gloucestershire County Mental Hospital late at night, but next morning she was examined by two other doctors and declared to be of sound mind. Her claim was for damages for Dr. Dill's negligence in thus certifying her; she also claimed damages for assault and for false imprisonment. Dr. Dill relied upon the defence embodied in the Lunacy Act—namely, that he signed the certificate in good faith and that he used reasonable care: he maintained that his conclusions regarding the plaintiff's condition at the time of her certification were correct.

The case came to an abrupt end in an unusual way. Nearly three days were occupied by the opening speech of counsel, the evidence of the plaintiff herself, and that of various witnesses called on her behalf. These included the matron and a nurse from the hospital, Dr. John Marnan, medical superintendent of the hospital, Dr. Thomas Cyril Smith, senior medical officer at the Second County Mental Hospital, Barnwood, Gloucester, Dr. T. B. Hyslop, and Dr. James Risien Russell. On the fourth day the case for the defendant was opened, and Dr. Dill went into the witness-box. While he was still under cross-examination, the jury asked if they could stop the case. Mr. Justice Avory invited them to write their opinion upon a piece of paper. If they were satisfied that the plaintiff had failed to establish her claim, they were, of course, entitled, at any time after the plaintiff's case had been fully set before them, to find for the defendant as was done in the Hume-Spry case. But they were not entitled to find against the defendant without giving a full hearing to what he and his witnesses had to say. When his Lordship and counsel had perused the contents of the paper on which the jury's opinion was recorded, it became apparent that the jury's intervention did not take the form of a decision in Dr. Dill's favour. Three courses were then possible. The jury having arrived at a premature conclusion adverse to Dr. Dill without having heard both sides, Dr. Dill could accept that conclusion and consent to judgment against himself—a step which no defendant was likely to take. The second course was that the case should proceed, the judge impressing upon the jury that they must keep an open mind until they had heard all the evidence. The third possible course was the discharge of a jury which had shown itself so ill-fitted for its judicial duties. The judge adopted the third course. If, therefore, the plaintiff persists in her action, she must begin it all over again before a fresh jury. The case being thus still sub judice, comment upon the value of the evidence would be improper. It may be mentioned, however, that Dr. Dill, in his evidence as reported in the *Times*, complained of the small space provided in the form of the certificate for the statement of the practitioner's grounds for signing it. He said he tried to condense an immense amount of detail as much as possible, and he agreed that he put down one matter under one heading in the certificate when it should have been entered under another. Later, in cross-examination, he agreed that he had included under "Facts observed by myself" a statement that it was obvious that Mrs. de Freville's child "cries and does not want to see her," although he had not in fact seen the child, and the entry should have been made under "Facts communicated by others." An error of this kind, of course, is not in itself negligence which entitles a plaintiff to recover damages, but it is worth mentioning here in order to impress upon practitioners who have occasion to sign certificates of this nature that any slip of this kind is fastened upon in cross-examination if the case leads to litigation. Probably it does not occur to every doctor who certifies a patient that, if there is no room on the form for what he wants to write, he can set out his full entries on a sheet to be annexed to the certificate.

Defence of Epilepsy on Murder Charge: Fresh Hearing on Appeal.

The Court of Criminal Appeal has power to hear any additional evidence on appeal and also to refer any point involving scientific investigation (which the court thinks cannot be conveniently conducted before the court) to a special commissioner for report or, if occasion arises, to appoint an assessor to the court who has special expert knowledge. Where there is an issue of insanity, it seems, the Court of Criminal Appeal abrogates its functions and transfers the matter from the judicial to the executive authorities. Giving judgment lately on the appeal of William Knighton, a collier, convicted at the Derbyshire assizes of having murdered his mother, Mr. Justice Avory began by declaring that the Court of Criminal Appeal had frequently laid it down that, where the issue of insanity had been before a jury and evidence had been called in support of the defence, the court would not enter further into the evidence on that subject, but would leave the matter to the Home Secretary, who could more conveniently and more effectively investigate any further evidence. The defence in Knighton's case was that of insanity arising from epilepsy; it was urged that the act had been committed in a state of automatism following an epileptic attack; the accused was on the best of terms with his mother, and there was no motive for the crime; he voluntarily surrendered himself to the police, and thus provided the only conclusive evidence connecting him with the crime. On appeal his counsel applied for leave to call further medical evidence which was not available at the trial. The application was rejected for the reason already given, and the appeal was dismissed.

The decision has had an unusual sequel. It is now announced that the defending solicitors have submitted fresh evidence to the Home Secretary, and that the latter has thereupon cancelled the execution and referred the case back (as he has statutory power to do) for re-hearing by the Court of Criminal Appeal as soon as sufficient time has been given to the preparation of the case. It will be interesting to see whether the fresh evidence is purely that of medical experts or otherwise. There will be an opportunity to observe whether the Home Secretary can induce the Court of Criminal Appeal to abandon the rule of excluding fresh medical evidence on appeal, or whether the Court still discriminates against the medical expert.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

WASHINGTON HOURS CONVENTION.

ON Thursday, March 31st, on the motion that the House do go into Committee of Supply on the Civil Service Estimates, and Estimates for Revenue Departments,

Mr. R. J. DAVIES raised the question of the ratification of the Washington Forty-eight Hours Convention. He said that he thought they were entitled to know what had been done in respect to a decision by the Government on this very important matter. The situation on the Continent of Europe was becoming very serious. They were being pressed by labour organisations in other countries, and particularly by Belgium, where this Convention has been ratified. In relation to questions affecting labour and working people generally, and the employment of women and children, the present Government, through the Minister of Labour and his Parliamentary Secretary, appeared to take no notice whatever of the Governing Body and conferences of the International Labour Organisation. The only measurement of the enforcement of labour legislation in any country was the number of inspectors appointed, the number of inspections of factories and workshops made, and the number of convictions for contravention of the law. The convictions in Belgium in 1925 were 650. In Czecho-Slovakia there were 1054, and in France, which they were told was more lax than any other country, the number was 6596. In Germany there were 615 convictions. In Great Britain, where the enforcement of these laws was supposed to be more stringent than anywhere else, the figure as against 6596 in France was just over 1000. That was to say, that for a smaller number of working people and a smaller number of factories and workshops, for every six convictions in France there was only one in our own country. The point that we should not ratify the Convention because other countries did not carry out their legislation in the same way as we did, fell to the ground in face of these figures. It was understood that Belgium had ratified the Convention unconditionally; France and Germany would ratify conditionally. He also wished to bring before the House the failure of the Government to ratify the Convention relating to the prohibition of the use of white lead in paint. He wished to pay tribute to the courage of the Chief Medical Inspector of Factories who, when he found that the Government had decided in favour of regulation instead of prohibition, resigned his position in the Home Office. A most sinister fact was that the Federation of British Industries in its official journal stated that they had communicated with the India Office, asking that Department to send to the Bombay Government a communication to the effect that as the British Government had decided not to prohibit the use of white lead in paint, but to regulate it, the Federation asked the Bombay Government to follow the lead of the British Government, and to destroy the provisions for prohibition that it had already set up. That was an appalling state of affairs. The fact that there were over 200 operative painters always suffering from lead poisoning ought to induce any Government of any political colour to ratify this Convention.

Mr. BETTERTON (Parliamentary Secretary to the Ministry of Labour) said that ratification was not to be obtained merely by registering ratification at Geneva, or by passing a resolution of the House. It involved the introduction of a Bill to bring the legislation of this country into conformity with the Washington Convention, and such a Bill naturally required very careful consideration. If it was right to ratify, the Government must at least know what the cost would be. The whole matter was now under the consideration of a Cabinet Committee.

Captain KING (Financial Secretary to the War Office) replying for the Home Office on the question of the White Lead Convention, said it was quite clear that there was no obligation on this Government or on any other to ratify that draft Convention. So far as the question of Bombay was concerned, he was not competent to answer for the India Office or for the Bombay Government. The Home Secretary had announced that the Regulations were on trial. It was hoped that they would be able to remove the danger from the use of lead paint. But if that was not so, the Government would come to the House for further powers.

The question that the Speaker do leave the chair was agreed to by 213 votes to 77.

SANDSTONE WORKERS AND PHTHISIS.

The House then went into Committee of Supply, Captain Fitzroy in the Chair.

On a vote of £57,410 for expenditure in respect of the Houses of Parliament Buildings,

Mr. GARDNER moved to reduce the vote by £100. He said that it was amazing that in the Memorandum which had been prepared in respect to this expenditure, the question of the health of the operatives who were to be called upon to work the Stancliffe stone which it was proposed to use for the repair of the Houses of Parliament, had never been mentioned. It could not be beyond the knowledge of His Majesty's advisers that danger existed in connexion with the working of this stone, because the Office of Works, when it had work to be done with that kind of material, paid the men an extra sum per hour because of the danger of working it. Sir Thomas Legge, who was till lately the Senior Medical Inspector of Factories, and who throughout his Civil Service career was engaged in reporting to the Government on work of this kind said:—

"In Great Britain the quarrying and dressing of sandstone, whether in Derbyshire, Yorkshire, or round Edinburgh—Edinburgh is largely built of freestone—must have cost a holocaust of lives. The geology of Derbyshire, indeed, has been marked out simply by the death-rate from phthisis—high on the sandstone areas, low on the limestone. This point is convincingly summarised by the Registrar-General's figures, showing that, as compared with 142 of the average male population between 25 and 65 years of age who die of phthisis, there die 127 granite dressers, 129 limestone dressers, and 415 sandstone masons."

Those figures were appalling enough, and for the Government to embark upon this scheme without first taking them into consideration was negligent to say the least of it. Sir Thomas Legge went on to say:

"The ultimate effects of silicosis are even slower to show themselves than in the case of lead poisoning. Years invariably elapse before the shortness of breath—the result of the slow but sure encroachment on the air spaces—which is the cardinal symptom, makes work difficult, and, to add to the trouble, the tubercle bacillus is as likely as not to find a nidus in the weakened lung. At present, unfortunately, methods of removing the dust at the point of production in chipping and dressing by hand have failed, although invention may yet find a way. Wetting the stone is a very partial success."

It was often suggested that the masons had only to wet the stone and their death-rate would be lowered, but those who knew the work knew that the man who wetted the stone hindered his output, and for economic reasons therefore he had to take the risk of disease. The Medical Officer of the Derbyshire County Council had conducted an inquiry into this subject. Taking the death-rate per thousand from 1901 to 1910, the rate among 124 persons, gritstone workers, was 13·7 from phthisis. Out of 426 stone workers, some in limestone in the two Matlocks and the two Darleys, the death-rate was 7 per 1000. Taking the gritstone and limestone workers generally, the rate was 5 per 1000. Among the persons employed in and about limestone quarries and works, the rate was 1·71 per 1000. Among limestone workers themselves it was 1·52 per 1000. Among persons employed in and about coal-mines in the same district the rate was ·68 per 1000. The standard phthisis death-rate was ·77 per 1000. Therefore, the workers on this kind of sandstone had to take the greater risk of a death-rate of 13·7 per 1000, as against the average phthisis death-rate of ·77. If they compared figures compiled for the same years in respect of the workers in Portland stone, they found that the death-rate among the masons was 1·4 per 1000, among the labourers 1·9, and for all other trades 1·1 per 1000. Dr. Brown, one of the medical officers connected with the Home Office, gave a report to that Department in 1922 in which he said that the development of this disease was remarkable. It grew in slow stages, and the men who suffered from it, although they appeared to be the same, ultimately died very quickly from its effects. If this kind of stone was introduced into London, Mr. Gardner continued, they would raise the maximum amount of disease among the men who had to work it, or alternatively they would have to bring men from the area from which the stone came, and they would have to send them back to their own districts and compensate them. It might be suggested that special tools, such as the pneumatic tool could be used, but the operatives in London were opposed to the use of this tool, and rightly so, because it only expedited the work and aggravated the disease. Portland stone was proving its durability, and was being used in place of sandstone, even in the sandstone areas.

Captain KING, replying on behalf of the Government, said that in 1922 the sandstone quarry owners in Derby decided to have an examination of their employees. They instructed the local medical officers of health to examine 291 operatives. Out of this number 5 were found to be suffering from silicosis and 7 from lung diseases. Eighty-four of the men were between 40 and 49 years of age, 51 were between 50 and 59, and 21 were 60 years of age and over. This showed that the working of this sandstone was not very injurious. All the medical officers of health reported favourably on the condition of the men examined. The medical officer of health of the North Darley Urban District Council supplied a statement of the death-rate from phthisis in his area from 1909 to 1920. The figures for 1919 and 1920 were representative of the remainder. In 1919 the death-rate per 1000 from

phthisis was 0·34; the number of deaths from that disease was one, a female. In the same year the rate for England and Wales was 1·55.

Mr. GARDNER: You cannot make comparisons of that kind; you must take it in connexion with the men engaged in that particular area.

Captain KING said that it was necessary to consider the state of health in the whole of that area. He did not consider that there existed any really satisfactory statistics to prove what was being contended either one way or the other. There was no doubt that those who worked sandstone did suffer to a certain extent from silicosis, and that complaint was not unknown among those who worked limestone. The matter however, had been carefully considered, and they intended to take every possible precaution to secure the health of those who worked on this stone, not only by damping the stone, but in other ways. The workshops in which the men would work within the precincts of the Palace of Westminster would have roofs which could be removed and opened completely in fine weather, so that the men would be working practically in the open air. By these precautions he hoped that no bad effects on the health of the workmen would be experienced. Hitherto the Home Office had never been requested to prohibit the use of silicious material, and it was unreasonable to suggest that while all other buildings and organisations in this country were still allowed to use this particular type of sandstone the Government should be denied the use of it in this case where it was considered to be the most serviceable stone for the purpose.

The motion to reduce the vote was negatived without a division.

NURSING HOMES (REGISTRATION) BILL.

On Friday, April 1st, Mrs. PHILIPSON, in moving the second reading of the Nursing Homes (Registration) Bill, said the principle of the measure had already been approved by a Select Committee of the House. That Committee came to the conclusion that the existence of a genuine need for the registration and supervision of nursing homes was fully established. In the first place the premises of many nursing homes were structurally defective and unsuitable; secondly the Committee were deeply impressed with the urgent need for registration and supervision, particularly in regard to the class of home which catered for poor people and senile chronic cases. In the third place they considered that in many nursing homes the accommodation for the nursing staff was seriously defective. Certain progressive areas such as London and Manchester had already in operation local Acts providing for the registration of maternity homes; and in 1926 Parliament passed a general Act providing inter alia for the registration of maternity nurses. The Select Committee came definitely to the conclusion that the registration and supervision of maternity homes should be made part of one comprehensive scheme covering all nursing homes. Following the principle adopted in the Midwives and Maternity Homes Act 1926, the Select Committee recommended that the authorities to administer any system of registration should be the county councils and county borough councils under the general supervision of the Ministry of Health. The Bill substantially gave effect to these recommendations. It proposed that the local authority should have power to refuse registration on the ground that the applicant was not a fit person, or that the premises were unsuitable. Many homes were managed by persons who were not qualified nurses, and it was thought that it would be arbitrary and unfair for Parliament to deprive these people of their livelihood. The Bill did not propose in the case of nursing homes in existence at the commencement of the Act to refuse registration if the person in charge was unqualified, but it did propose to insist that the person who was superintending the actual nursing of the patients should be a qualified nurse. While maternity homes were brought into the scheme by the repeal of Part II. of the Midwives and Maternity Homes Act, 1926, a special provision was inserted because provision had to be made for the special qualification of certified midwives who normally would be found in many of these establishments. In the event of a local authority refusing to register, or cancelling registration, there would be power to appeal to a Court of Summary Jurisdiction, and, if the need arose, to Quarter Sessions. The duty of inspection was to be carried out by officers of the local authority, and there was a proviso designed to secure that there should not be any inquiry into the medical records of individual patients, which was a confidential matter. Under Clause 6 there was provision for the temporary exemption of certain establishments of a charitable nature, and an appeal was allowed if any person was aggrieved by the refusal of a local authority to grant exemption. Clause 9 gave a definition of "nursing home" which was designed to exclude certain establishments which were maintained by public authorities or were constituted by special Act of Parliament or incorporated by Royal Charter. The definition also excluded any institution which was liable to inspection under the Lunacy Act or the Mental Deficiency Act. The definition of "qualified nurse" in Clause 9 brought it into relation with the Nurses' Registration Act, 1919. Clause 10 provided for proper safeguards for the repeal of local legislation, as it was very desirable that this general Act should supersede local Acts in various parts of the country. If Parliament passed this Bill it would be a safeguard against abuses without unduly interfering with well-conducted establishments and without impairing the privacy of treatment that patients and their medical advisers desired. The Bill fulfilled its purpose through existing machinery, and aimed at raising the standard of the conditions under which the sick were nursed, and also the conditions under which the nursing profession performed their duties.

Mr. GERALD HURST, in seconding the motion for the second reading, said the movement for reform in this matter originated among the nurses themselves. The Norwich Nursing Association first raised this question some years ago, because they were appalled by the fact—which was still a fact to-day—that there were up and down the country some hundreds of institutions which called themselves nursing homes, although there were not any qualified nurses on the staff, and although it was an absolute mockery to call such institutions homes. As the law stood at present, the words "nursing homes" connoted nothing, and had no legal significance. The result was that the public were persuaded again and again to enter institutions which were, in substance, bogus nursing homes. Those who went to a nursing home ought to know that it was not a bogus one, and at present, even in the case of homes which were owned by medical men, those doctors might be quite ignorant of the qualifications and characters of the nurses, and the accommodation and amenities of the home which they controlled and ran. Inspection need not necessarily be inquisitorial. A reasonable inspection by qualified persons at reasonable times would, he was sure, be objected to by no one who carried on a properly-conducted nursing home. There was in the Bill, as now drafted, a mistaken view put forward as to the person who should carry out the inspection. The Committee recommended that it should be carried out by the medical officer of health, assisted by his technical staff, that was to say, a nurse qualified to go into the matters of nursing, or a sanitary officer to go into questions of sanitation as the case might be. In the Bill the word "inspector" was used. That was not what the Committee wanted. He thought that the practical unanimity among expert opinion and non-professional opinion on this question was eloquent as to the need for this Bill. The reason why the Bill only dealt with future maternity homes was that existing nursing homes were effectually and completely covered by the Act passed last year. With regard to future homes, the condition to be met before registration was granted, was that the home must be under the charge either of a doctor or a qualified nurse, and then the Bill ought to read, in his view, "in that case there should be a proper proportion of qualified nurses on the staff." According to the evidence submitted to the Committee it cost no more to employ a qualified nurse than an unqualified one. The evidence given before the Committee satisfied all the members, including the medical members, that abuses were rife in homes owned by doctors, as well as in those run by unprofessional persons. He was not reflecting on the whole body of the medical profession, but the fact was established that homes owned by doctors were not necessarily immune from the abuses to which other nursing homes were liable. No doctor of any status would object to having his home registered. Registration conferred a status rather than a stigma. With a view to meeting hard cases, as far as existing institutions were concerned, the definition of a qualified nurse had been enlarged so as to include, not merely State registered nurses, but those who, before the commencement of this Act, had completed a three-years course defined in the Bill.

Replying to Mr. A. V. ALEXANDER, Mr. HURST gave it as his opinion that if in a convalescent home nursing was given, it would certainly come within the definition of a nursing home.

Sir DOUGLAS NEWTON moved the rejection of the Bill, which he said provided for undue and unnecessary centralisation. The authorities who would be responsible for administering the Bill would be the council of every county and county borough. That cut out the whole of the non-county boroughs of the country. These non-county boroughs, which were the local education authorities and the authorities under the Maternity and Child Welfare Act, ought to be empowered to administer this Bill. If the powers of the Bill were vested in the county council, and they had no power to delegate their functions to other local authorities, they would be put to considerable additional expense by increase of staff and travelling expenses of officials to and from the nursing homes. He was fully in sympathy with the Bill in regard to the care and welfare of the sick.

Mr. HARRISON seconded the rejection of the Bill.

Dr. DRUMMOND SHIELS said he hoped the Bill would have a smooth passage through the House. He did not think

that the general public or the ordinary members of the House realised the need for this legislation. The members of the Select Committee—he spoke for himself at any rate—had no idea that the matter was so serious, and that a Bill of this kind was so much required. It was not a matter entirely of the status of the home; they found that some homes where very large fees were charged, were unsatisfactory, but what they were most impressed with was the number of cases of chronic senile poor people who were kept under deplorable conditions. In one case a home was run by a man and his wife and one small maid-of-all-work, who did the nursing and the housework as well, and attended to 15 or 20 people, practically all of whom were bed-ridden, and could not attend to themselves. The house was filthy, the bed linen was not changed for weeks, the patients and their surroundings were verminous, and the matron or her husband, either separately or together, were frequently under the influence of drink. Regulations should be brought about to prevent such homes from existing at all. The great problem of course in this, as in many other matters, was poverty. These people were paying from 15*s.* to 25*s.* per week. It was quite impossible to get even adequate food and housing for that sum, apart altogether from nursing. Such people, if that was all they could pay, ought to be in a public institution. He believed that in that connexion the increasing use of Poor Law hospitals, with the removal of the stigma would be a very great help to the solution of this problem. He was glad that an attempt was made in this Bill to see that nurses were properly housed. They had very bad evidence before the Committee, even in regard to good homes, on that point. He hoped also that there would be a quota of fully trained nurses in each home. Only slight alterations were necessary to make the Bill perfectly suitable to Scotland, and he would like it to be applied to that country.

Sir RICHARD LUCE said, that as a member of the Select Committee, he supported the second reading of the Bill. He came to the question with an open mind when the Committee began their investigation. In days gone by he had found homes in which he had to work which were not as satisfactory as he would have liked, but he had not, in recent years at any rate, come to the conclusion that there were any very great scandals going on in such nursing homes as were brought to his notice. But when the Committee started to take evidence his views very rapidly changed, and he soon came to the conclusion that there was a very real need for the registration of these homes. The trouble was mostly not in the regular surgical nursing homes, but more in those which were the sort of odd places that took in a poor class of patients for small fees, and also certain other places which did not hesitate to take a class of patient which they were totally unfitted to deal with. When the original Bill was mooted some two years ago, there was a good deal of objection from the medical profession on certain grounds. He thought they had not realised the real seriousness of the question. Though there was no general objection to registration, the body of the medical profession did lay down certain rules which they would consider necessary. They were very anxious that there should be a delegating body which would be responsible for granting registration, and that there should be representation of medical men and also of nurses. Another great point that was made was that there should be sanctity of professional secrecy between patient and doctor, which he thought had been fairly met in Clause 5. Then there was at first a great demand on the part of the medical profession that homes under the charge of medical practitioners might be exempted, if not from registration, at least from inspection. That exemption was permitted in the Midwives and Maternity Homes Act last year. He thought that the evidence given before the Select Committee, which proved conclusively that certain homes owned by doctors were not above suspicion, had considerably modified the original view of the medical profession, and they would no longer demand the inclusion of an exemption clause. Personally he thought it would be a great mistake to insert such a clause. He saw no objection from the medical point of view to the Bill as it now stood. If the measure was carried out in the proper spirit, there would be four great things gained. They would have gained a coördination of the two kinds of homes, which were, previously separated. There was no great difference between a maternity home and a nursing home. By bringing the two classes under registration, they would bring about a coördination which was necessary and reasonable. Further, if the Bill became law, they would secure that nursing homes would have suitable buildings and be properly equipped for the nursing profession according to the class of case they took in. There would also be guaranteed a reasonable standard of nursing. It was quite impossible for every patient to be treated entirely by completely qualified nurses; there were not enough in the country to provide for that purpose, and there must always be a certain number of people who were under training, or passing up to the stage of training. In general hospitals there was only a small proportion of qualified nurses, and there was always a large number of pupil nurses who were undergoing training who did a great deal of the work of nursing the sick in hospital, and there was no reason why a similar sort of arrangement should not be allowed in nursing homes as long as the requisite standard of nursing was maintained. There would also be considerable gain in the case of the nurses themselves. The Committee received a considerable amount of evidence from the proprietors of nursing homes, and from others as well as doctors, that it was essential that the supervising authority should be entirely independent. The Committee felt that it was not wise in the ordinary way that the supervising authority should be a small one. At any rate, it ought to be a borough of very considerable size with a whole-time medical officer of health and complete staff. There were one or two points of criticism, really Committee points, which struck him in reference to the Bill. Clause 1, sub-section (3) (*e*) did not, so far as he could make out, allow of the patients in maternity cases being attended by a doctor. There might also be difficulties about a nursing home certifying the cause of the death of a patient. It was no business of a nursing home even to have any knowledge of the cause of death under certain circumstances. One could realise that it might be necessary in maternity homes where a considerable number of septic cases were occurring, and when it was known that septicæmia was prevalent in the home; but that was a question of notification rather than of letting them know the cause of death. In the Bill passed last year dealing with the registration of births and deaths, it was laid down that it was the duty of the doctor to send the certificate as a confidential document to the registrar. Therefore, it was not within the rights of a nursing home to have any knowledge of the cause of the death of a patient who had died in the home. It might be a matter of very considerable importance in many cases that the cause of death should not get out, even to the nursing staff. A patient might be suffering from some disease which was due to alcohol. It was not right that that cause of death should be given out to everybody far and wide. He thought there was also some little doubt about the question of the qualified nurse which might be cleared up in Committee.

Major ELLIOT (Under Secretary of State for Scotland), who apologised for the unavoidable absence of the Minister of Health, said that the view of the Government was that, taking the measure as a whole, it was quite reasonable that the House should give it a second reading and place it on the Statute Book. He thought that Sir D. Newton and Mr. Harrison had made out a strong case in favour of the non-county boroughs. That matter might be further considered in Committee. The number of homes concerned was perhaps larger than the House realised. The Registrar-General in his returns mentioned that there were over 2000 convalescent and nursing homes in England and Wales and, in fact, the number might run as high as 3000. It was quite possible that, with such a large number of institutions, abuses might have crept in. If this Bill was passed they would be able to see whether the beneficial results which had been found in places like London and Manchester would be paralleled in the case of the nursing homes in other places throughout the country.

Dr. VERNON DAVIES said that the point which the House must consider was that the matter with which the Bill sought to deal was nothing less than a scandal and must be dealt with as quickly as possible. It was a great step in advance that the medical profession had withdrawn their objections to the inspection of homes owned by doctors. What they were aiming for was that the health of the country should be looked after by competent and trained people, medical men and nurses; that all abuses should be done away with; and that nothing should be hidden.

The motion for rejection was not pressed, and the Bill was read a second time and committed to a Standing Committee.

MIDWIVES AND MATERNITY HOMES (SCOTLAND) BILL.

The Midwives and Maternity Homes (Scotland) Bill has been considered by the Standing Committee on Scottish Bills. Sir CYRIL COBB was in the chair.

On Clause 1 (which amends the Midwives (Scotland) Act of 1915) Mr. MAXTON moved an amendment to confine the liability to prosecution and penalty to unqualified persons who attended women in childbirth "habitually and for gain." He said that while it was very desirable that the object of the Bill should be achieved, and that highly-trained women should look after the responsible work of midwifery, it was also desirable that the ordinary decencies of neighbourly life should not be made impossible by the operation of this clause, which was so severe that the onus was put on a woman who rendered assistance in these cases to prove that she had only done so in a case of sudden and urgent necessity. He held that the responsibility should be on the authorities to prove that such a woman had been in the habit of doing this work for payment.

Mr. BARCLAY HARVEY, who was in charge of the Bill, resisted the amendment. While there was no desire to prosecute any woman who came in to help in a case of emergency, the amendment, he said, would knock the bottom out of the clause.

Dr. DRUMMOND SHIELS said that in Scotland maternal mortality had remained high for practically two generations, and there had been very little diminution. The neighbourly attentions to which reference had been made were responsible for a great deal of that maternal mortality. The main cause of death in these cases was puerperal sepsis, which was due to the neglect of aseptic precautions which unqualified persons could not be expected to understand. He suggested that Mr. Maxton's point would be met by an amendment which he (Dr. Shiels) intended to move later.

Mr. MAXTON indicated that he wished to press his amendment.

Dr. VERNON DAVIES said that the insertion of the words "habitually and for gain" provided a very bad loophole. He thought that the object of Mr. Maxton was covered by the clause as it stood.

Lieut.-Colonel FREMANTLE asked the Committee not to accept the amendment which, he said, would condemn many mothers to the risk of putting their lives in the hands of incompetent women.

After further discussion,

Major ELLIOT (Under Secretary for Scotland) said that the position of a woman about to give birth to a child had always been regarded as something exceptional both by Scottish law and the law of other countries. It was the only case in which there was a statutory prohibition against action by unregistered persons. There was no prohibition against engaging in medical practice, but there was a prohibition against engaging in midwifery practice. This amendment would make an exception to the law. Dr. Shiels had an amendment on the paper which he thought constituted a reasonable compromise, although he was advised that that amendment would require the addition of certain words to cover also the case of the registered medical practitioner. When the time came for Dr. Shiels' amendment he would advise those in charge of the Bill to accept it. In the meantime he suggested that the Committee should negative Mr. Maxton's amendment.

Mr. Maxton's amendment was rejected by 26 votes to 12.

Dr. SHIELS moved an amendment providing that there should be no prosecution in a case where reasonable efforts had been made to obtain the services of a duly qualified medical practitioner, or a person certified under this Act.

The amendment was agreed to.

Mr. MAXTON objected to a proviso which exempted medical students from the provisions relating to unqualified attendance.

Major ELLIOT assured the hon. member that the General Medical Council was duly cognisant of its responsibility in these cases. In all cases where students were sent out to midwifery cases they had had previous experience in hospital, and they went out to their earlier cases with a registered medical practitioner from the school which they had been attending.

On Clause 8 (Registration), Dr. SHEILS moved an amendment to provide that improper sanitation should be one of the grounds on which an application to register a maternity home might be refused.

The amendment was agreed to.

Major ELLIOT moved an amendment providing that in the case of a maternity home which was not in existence at the commencement of the Act, the person having the superintendence of the nursing of the patients should either be a qualified nurse or a certified midwife. He explained that this amendment strengthened the provisions of the Bill and made it clear that a person having the superintendence of the nursing must have the C.M.B. qualification.

The amendment was agreed to.

On Clause 12 (Inspection of Maternity Homes), Mr. BARCLAY HARVEY moved an amendment providing that nothing in the Act should be deemed to authorise any officer sent to inspect a maternity home, who was not a duly qualified medical practitioner, to inspect any medical record relating to any patient in such a home. He said that he understood that this covered a point which had been made by Dr. VERNON DAVIES. It should provide a sufficient guarantee of secrecy.

The amendment was agreed to.

On Clause 14 (Power to Exempt Certain Institutions from Registration and Inspection),

Dr. VERNON DAVIES moved an amendment to secure that the local supervising authority might exempt any hospital or similar institution not carried on for profit and not used mainly as a maternity home. He said that the reason for this amendment was that there were certain homes for women where girls were taken in and occasionally gave birth to a child.

Dr. SHIELS said that although he supported the amendment he was rather unhappy about the terms of it. He quite recognised that in a public voluntary hospital inspection might not be necessary, but there were many institutions, especially of a charitable or semi-charitable nature, which were conducted on very unsatisfactory lines, and he hoped that the Scottish Board of Health would exercise a little supervision.

Lieut.-Colonel FREMANTLE said that he understood the object of Dr. DAVIES, but he thought he was proposing a phrase which it would be impossible to administer.

Major ELLIOT said that his hon. friends could thresh the matter out for themselves. As the hon. member in charge of the Bill did not raise any objection to the amendment he did not think that it was a matter in which the Government, as such, should intervene. The amendment might, he thought, be accepted.

The amendment was agreed to.

On Clause 15 (Interpretation), Major ELLIOT moved words to make it clear that "qualified nurse" meant a person registered in the general part of the Register required to be kept under the Nurses' Registration (Scotland) Act, 1919, or a person who had before the commencement of this Act completed a three years' course of training in a hospital which, during the period of her training, or subsequently, had become a training school approved by the General Nursing Council for Scotland, the General Nursing Council for England and Wales, or the General Nursing Council for Northern Ireland, for the purposes of admission to the general part of such register.

The amendment was agreed to.

The Committee stage was concluded and the Bill was ordered to be reported to the House.

SALE OF FOOD AND DRUGS BILL.

This Bill passed through Committee of the House of LORDS on Tuesday, April 5th, without amendment.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 30TH.

Medical Scales for Merchant Ships.

Mr. CONNOLLY asked the President of the Board of Trade how often the standard list of drugs and appliances which all sea-going ships must take with them was revised in order to keep pace with modern developments.—Sir BURTON CHADWICK (Parliamentary Secretary to the Board of Trade) replied: The last revision of the medical scales for merchant ships was issued in 1924, and the preceding one in 1912.

Outbreak of Small-pox in Dundee.

Mr. JOHNSTON asked the Secretary of State for Scotland, whether he could give the House any information regarding the outbreak of small-pox in the congested area in Dundee; if the source of infection had been traced; and what precautions were being taken against the spreading of the disease. Sir J. GILMOUR replied: I understand that up to this morning 42 cases of small-pox had been diagnosed in Dundee. Of these, four are adults, two are persons of 16 years of age, and the remainder are children of school age or under. With the exception of the four adults, who were vaccinated in infancy, all the cases were unvaccinated. The disease is very mild in type, and the outbreak is confined to a limited area in the east end of the city. The source of infection has not yet been traced, but a member of the staff of the Medical Officer of Health is wholly engaged in endeavouring to discover how the disease reached Dundee. All cases are removed to hospital and steps are immediately taken to carry out disinfection. Another pavilion is being erected with the utmost expedition at the hospital; and, in the meantime, a marquee is being used as emergency accommodation, and two others are available if required. Doctors, inspectors and nurses are carrying out a house-to-house visitation in the infected area, to keep the outbreak under control, and cases of contact are removed to a reception house or kept under daily medical observation in their homes. A special staff is engaged on vaccination work under the direction of the Medical Officer of Health, who is, in addition, supplying lymph to general practitioners free of charge. Lymph for 16,000 persons has so far been issued; centres have been established at which anyone may be vaccinated at any hour of the day, within reasonable distance of his residence, and arrangements are being made for the vaccination of the staffs of workplaces and the inmates of institutions, etc. Vaccination is also being carried out at schools. As a precautionary measure, steps are also being taken to make chicken-pox compulsorily notifiable throughout Scotland without delay, but meantime this is already in operation in Dundee by arrangement with medical practitioners.

Mr. JOHNSTON: Do I understand the right hon. gentleman to say that all these cases have arisen in the congested

areas in the east end of Dundee, and if so can he take other steps than merely vaccination to limit or prevent the spread of this disease?

Sir J. GILMOUR: I think my answer will show that every possible step is being taken to deal with the outbreak at the source by the method of vaccination.

Mr. JOHNSTON: Has the right hon. gentleman taken any steps of a sanitary nature to deal with the outbreak?

Sir J. GILMOUR: Yes, Sir. The officers responsible for the health of the city are taking every possible step in every direction.

Dr. VERNON DAVIES: Will the right hon. gentleman try to ascertain how many so-called conscientious objectors are now submitting to vaccination?

No answer was given.

Health Year Book of the League of Nations.

Mr. BENJAMIN SMITH asked the Secretary of State for Foreign Affairs why no report regarding conditions in Great Britain was included in the Health Year Book recently published by the League of Nations.—Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) replied: A comprehensive survey of the health conditions of the country is contained in the annual reports of the Ministry of Health, and of the Chief Medical Officer and the Registrar-General. My right hon. friend is not clear that the value of a summary, necessarily much condensed, of the statistics already published would be commensurate with the labour and cost involved in its preparation, but the question will be further considered.

Bakehouse Used as Sleeping Apartment.

Mr. WILLIAM THORNE asked the Home Secretary if his attention had been called to the remarks made by the coroner at the inquest held at Hackney on the 23rd instant in connexion with the death of a baker who had been sleeping in a bakehouse for a considerable time; and whether he intended taking any action in the matter.—Sir WILLIAM JOYNSON-HICKS replied: I am informed that the local authority, who are responsible for the administration of Section 100 of the Factory and Workshop Act, 1901, have decided to take proceedings against the occupier.

THURSDAY, MARCH 31ST.

Pensioners and Light Metal Limbs.

Major HILLS asked the Minister of Pensions if he was aware that a number of pensioners with below-knee amputation had asked to be fitted with light metal limbs in preference to wooden limbs, and that in most instances such applications had been refused; the number of cases in which pensioners with below-knee amputation had been fitted with light metal limbs, and in how many of these cases the pensioner had afterwards reverted to the use of wooden limbs.—Major G. C. TRYON replied: I have no information to confirm the statement made in the first part of this question but, on the contrary, I am informed by at least one of my largest limb-fitting centres that a number of pensioners who have been fitted with metal limbs wish to exchange them for the new and lighter willow limbs and that more complaints are received from pensioners wearing the metal limb than from those wearing the wooden type. The number of cases in which pensioners with below-knee amputations have been fitted with metal limbs, was, in the 12 months ending February last, about 2000, but I have no specific record of the number of cases asked for in the last part of the question.

Relieving Officers and Medical Relief.

Mr. ROBERT RICHARDSON asked the Home Secretary whether he was aware that by the operation of Section 62 of the Rating Act, 1925, and of the Overseers Order, 1927, the overseers would be abolished on 1st April next, and their powers and duties as to relief from poor rate in cases of sudden and urgent necessity and medical relief would be transferred to any relieving officer; that the power of any justice of the peace to order the overseers in certain cases, by writing under his hand and seal, to give temporary relief in articles of absolute necessity but not in money and, in certain cases, to give a similar order for medical relief only, would become a like power to give an order to any relieving officer; and whether he proposed to draw the attention of the justices of the peace to this change in the law.—Sir W. JOYNSON-HICKS replied: Steps are being taken to bring the provision to the notice of justices.

Committee on Sexual Offences.

Miss WILKINSON asked the Home Secretary whether, in view of the fact that last Session he proposed to delay the introduction of any legislation based on the Report of the Committee on Sexual Offences until the Committee on Young Offenders had reported, he would take advantage of the fact that this latter had now reported and introduce legislation at an early date.—Sir W. JOYNSON-HICKS replied: It will take me some time to complete my consideration of the very important recommendations of the Committee on Young Offenders which has just reported, but I adhere to my intention to deal with the recommendations of the two Committees together so far as they require legislation.

Certification of Boy under Lunacy Act.

Major ALAN MCLEAN asked the Home Secretary whether his attention had been drawn to the case of Reggie Ford, aged 12, who was in 1922 committed to an industrial school and was now in a mental hospital; and whether he would cause inquiries to be made as to the circumstances leading to his present condition.—Sir W. JOYNSON-HICKS replied: The case of this little boy was brought to the notice of my predecessor, who made careful inquiry, and on June 27th, 1924, stated in reply to a parliamentary question that he was "Satisfied that the magistrates, who included two women magistrates, dealt with the case with the fullest sympathy and with a desire to do what was best for the boy. The parents admitted that he was given to pilfering, that he was falling under the bad influence of older boys, and that they were unable to control him; and they asked that the boy might be sent away to school." I agree entirely with my predecessor's statement. When the boy was received into the school in January, 1923, he was said to suffer from a nervous disorder, and special attention was given to him under the supervision of the school doctor. As the nervous symptoms increased he was examined by a Home Office Medical Inspector, who came to the conclusion that the boy was probably suffering from the after-effects of encephalitis lethargica. Arrangements were then made for the transfer of the boy to another school where, with the coöperation of the Somersetshire Education Committee, a special nurse was engaged for him for a considerable time, and where he received unremitting care. Arrangements were also made for his special observation in a London hospital. The boy, however, steadily grew worse and, as it was impossible to keep him in the school, he was discharged to the care of the Guardians in July, 1925. Since then, I understand, that the boy has been certified under the Lunacy Act and is now in a mental hospital.

Committee on Registration of Opticians.

Mr. ROBERT WILSON asked the Minister of Health whether he was now in a position to announce the names of those who would form the committee to inquire into the registration of opticians?—Mr. CHAMBERLAIN replied: The Committee which has been appointed jointly by my right hon. friend the Secretary of State for Scotland and myself has now been constituted as follows:—Mr. F. B. Merriman K.C., M.P. (*Chairman*), Mr. O. Aves, Mr. W. B. Barker, Mr. H. B. Brackenbury, M.R.C.S., Mr. L. G. Brock, Mr. E. Treacher Collins, F.R.C.S., Mrs. W. L. Courtney, Lord Cozens-Hardy, Mr. R. J. Davies, M.P., Mr. H. L. F. Fraser, LL.B., Dr. C. O. Hawthorne, F.R.C.P., Mr. G. E. Houghton, Sir Henry Keith, and Mr. J. S. Henderson, of the Ministry of Health (*Secretary*).

Physical or Medical Disability in Air Force Recruits.

Mr. HORE-BELISHA asked the Secretary of State for Air what percentage of new recruits for His Majesty's Air Force were discharged on account of some physical or medical disability in 1926 within 12 months of their acceptance.—Sir S. HOARE replied: The answer is 1·46 per cent.

Death-rates of Centenarians.

Mr. DAY asked the Minister of Health the number of persons, both male and female, whose age exceeded 100 years and whose death had been recorded in England and Wales for the five years ended to the last convenient date.—Mr. CHAMBERLAIN replied:—The following are the figures asked for by the hon. member: Deaths at age 100 and over in England and Wales.

Year.	Males.	Females.	Year.	Males.	Females.
1922	18	59	1925	23	69
1923	22	74	1926*	27	61
1924	22	64			

* The figures for 1926 are provisional.

The New Food Preservative Regulations.

Mr. CAMPBELL asked the Minister of Health, if, in view of the new regulations affecting the use of preservatives in food, he had issued, or proposed to issue, to local authorities a suggestion that they should take special pains to warn consumers that certain foods should not be expected now to keep so long in a condition fit for human consumption.—Mr. CHAMBERLAIN replied: No, Sir, I do not propose to make any such suggestion, since only experience can show how far, if at all, the keeping properties of food in the consumers' houses would be affected by the absence of preservatives. I may say, however, that in making the regulations I had regard to the circumstances of the ordinary household, and to the fact that most of the principal foods affected were already being sold without preservative by some traders.

MONDAY, APRIL 4TH.

Mentally Defective Children in Surrey.

Mr. ROBERT MORRISON asked the President of the Board of Education how many ascertained mentally defective children there were in the elementary education area of the Surrey county council; for how many of these was appropriate provision made by the local education authority; for how many was no education of any kind provided; and what steps, if any, he had taken to secure that appropriate education was given to those mentally defective children not receiving it in Surrey.—Lord E. PERCY replied: According to returns furnished by the Surrey Authority, there were in their area in 1926, 259 ascertained educable mentally defective children, of whom 41 were at special schools, 133 at public elementary schools, and three at other institutions. The question of making further provision for children of this type is, I understand, engaging the attention of the Authority.

Vaccination Technique in Southport.

Mr. GROVES asked the Minister of Health whether he was aware that the medical officer of health for Southport received a letter from the Ministry of Health stating that the severity of the vaccination reaction reported from Southport had been noticed in other districts and appeared to be caused more by the technique used in vaccinating than by the virulence of the vaccine lymph, and suggesting that a single incision four-fifths of a centimetre long should be made and no criss-cross incision; and whether this was the official view of the Ministry.—Sir KINGSLEY WOOD replied: My right hon. friend is aware that a letter was written by a medical officer of the Ministry (after having made a local inspection) to the Medical Officer of Health of Southport generally on the lines set out in the first part of the question, except that it was made clear that four marks should be made, *each* by a single-line incision, not 4/5 centimetre but 4/5 millimetres long. The official view of the Department is set out in the instructions to vaccinators under contract, and the suggestions made in the letter are quite consistent with that view.

TUESDAY, APRIL 5TH.

Silicosis among Stone-workers.

Dr. VERNON DAVIES asked the Secretary for Mines to give for the last three years for which statistics were available the number of cases of silicosis reported among stone workers; the number of deaths from this disease; the number of cases which developed pulmonary tuberculosis and died therefrom; and the kinds of stone which proved to be most liable to produce silicosis among stone workers. Colonel LANE FOX replied: Silicosis is not in general a disease which is required to be reported and the detailed information asked for is therefore not available, but it may be stated that the kinds of stone most liable to produce silicosis are the more highly silicious sandstones and granite. More information will be available on this point when I have the results of a medical inquiry into the dust danger among workers in sandstone which has been undertaken by my right hon. friend the Home Secretary in which my Department is collaborating.

Mr. HARTSHORN: Can the right hon. gentleman say when he expects to obtain that report?

Colonel LANE FOX: No Sir.

Mr. PALING: In view of the increase in the number of cases of silicosis is there any prospect of it being scheduled as an industrial disease?

Colonel LANE FOX: Clearly we must have the report before we can take any action of that kind.

CENTRAL LONDON OPHTHALMIC HOSPITAL.—Plans have been prepared for an extension of the buildings, and private paying wards are to be provided, together with better accommodation for the nursing staff. Last year more than 1000 accident and urgent cases were attended and 2036 operations, 469 of them of a major character, were performed.

ANCOATS HOSPITAL.—This hospital, which is situated in one of the most crowded industrial areas of Manchester, will celebrate its centenary in August, 1928, and will shortly make a special appeal for help in carrying out improvements, including a new ward of 100 beds. There is a waiting-list of 900, and it is stated that not half the patients on it will ever be admitted. Even with the present accommodation 20,000 accidents and casualties are treated annually. At least £100,000 will be required for the establishment of the new buildings. It appears from the record of the hospital that, for the first quarter of its century of life, it spent anything up to £50 a year on leeches for blood-letting.

Medical News.

UNIVERSITY OF DURHAM.—At recent examinations the following candidates were successful in the undermentioned subjects:—

THIRD EXAMINATION FOR THE DEGREES OF M.B. AND B.S.

Pathology and Bacteriology; Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence.—M. J. Arnott, T. L. Kelly, and H. D. Ord.

Pathology and Bacteriology; Materia Medica, Pharmacology, General Principles of Therapeutics, and Pharmacy; Public Health; Medical Jurisprudence.—* Coley Goldstein, * J. M. Tait, and * H. G. Ungley, H. M. Brown, D. S. Buchanan, W. C. E. Diamond.

* With second-class honours.

UNIVERSITY OF LIVERPOOL.—Dr. W. S. Patton has been appointed to the Dutton Memorial Chair of Entomology.

At recent examinations the following candidates were successful:—

Diploma in Tropical Medicine.

C. P. Allen, M. L. Bahl, B. Barrowman, J. D. Bilimoria, W. M. Burns, E. J. Daly, G. A. Dunlop, V. Dyream, M. Farid, *A. M. Gillespie, S. A. Gunawardana, J. Harkness, R. Hay, N. M. Hodivala, Emma Hughes, Kathleen M. Hyslop, R. E. Ingram-Johnson, J. S. Kapadia, J. Macdonald, R. S. McElroy, W. S. Maclay, H. G. Maguire, A. F. Mahaffy, A. H. Malhotra, H. L. Malhotra, B. S. Manghitmalani, J. N. Mehra, A. J. Murray, H. M. Nevin, N. T. Olusoga, D. B. Parakh, M. R. Peters, * R. S. Rao, S. R. A. Shah, J. F. Southward, Frances C. Thompson, B. J. van de S. de Villiers, and R. Walkinshaw.

* Recommended for the Milne Medal.

Diploma in Tropical Hygiene.

T. A. Austin, B. Barrowman, W. W. Beeson, J. C. St. G. Earl, J. Hamilton, C. F. McCon, Winifred H. Mitchell, R. Nixon, W. S. Ormiston, and A. Robertson.

UNIVERSITY OF MANCHESTER.—At a recent examination Dr. T. N. Fisher was approved for the Certificate in School Hygiene.

UNIVERSITY OF DUBLIN.—At recent examinations the following candidates were successful:—

FINAL MEDICAL EXAMINATION—PART I.

Therapeutics, Jurisprudence, Pathology, &c.—D. S. P. Wilson, H. S. Smithwick, A. G. C. Ffolliott, Kenneth Watson, William Crawford, R. I. G. Reid, F. R. Falkiner, J. E. M'Mahon, P. A. Thornton, and W. I. Chapman. In Completion: J. A. Dowds, Izaak le Roux, E. du P. Meiring, and J. E. Wells.

PART II.

Medicine.—*R. A. Q. O'Meara, Maximilian Gerber, W. F. Lane, M. F. N. Griffin, R. W. T. H. Stewart, R. S. F. Hennessey, G. S. Smyth, R. D. Whiteacre, C. F. Cope, Patrick Brangan, S. D. K. Roberts, G. O. Taylor, E. A. Ellis, C. L. Day, N. J. U. Mather, Maurice Sherowitz, S. B. Dalrymple, S. R. Elmes, M. G. J. Booysen, Norah W. Brown, W. F. Knobel, C. de W. Meintjes, A. C. C. Charles, D. M. Carson, and H. C. Weir.

Surgery.—Solomon Behr, G. O. Taylor, G. S. Smyth, Solomon Gurevich, P. M. Garry, G. D. Edwards, M. G. J. Booysen, Maurice Sherowitz, and R. C. U. Warrington.

Midwifery.—*P. M. Garry, *E. M. Gamble, T. J. Millin, Maximilian Gerber, R. M. Moore, J. R. Hanna, Hyman Dundon, J. M. M'Elligott, I. F. Ratthaus, and Izaak le Roux.

* Passed on high marks.

DIPLOMA IN PUBLIC HEALTH.

Part I.—Meave Halligan, Brenda M. Young, Sarah M. Coghlan, J. V. M'Nally, Kathleen M. Ball, Kathleen M. Kennedy, and Margaret E. Pedlow.

Part II.—Anna M. Allen.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS.

Anne Siret, and Pritmila Mehta.

MEDICAL INSPECTION OF SCHOOL-CHILDREN IN DUBLIN.—It was announced last week that the Dublin City Commissioners have prepared a scheme for the inspection of school-children along lines suggested by the medical officer of health. Two medical officers are to be appointed to act as school medical officer and assistant school medical officer respectively, with the help of two nurses. The salaries of the medical officers will be £700, rising by increments of £40 to £900, and £500 rising by increments of £20 to £700. It is intended that the school medical service be coördinated with the maternity and child welfare scheme, and this scheme will be put in the charge of the school medical officers.

BRITISH ORTHOPÆDIC ASSOCIATION.—The Robert Jones Medal and Prize offered by the Association for 1926 has not been awarded.

ROYAL SOCIETY OF MEDICINE.—The Society's house and library will be closed from Thursday, April 14th, to Tuesday, April 19th, both days inclusive.

BRITISH SCIENCE GUILD.—A dinner will be held at the Criterion Restaurant, London, on May 12th. Particulars may be had from the Secretary, at 6, John-street, Adelphi, London, W.C. 2.

MEDICAL SOCIETY OF LONDON.—At a meeting of this society held on March 28th the following were elected Honorary Fellows: Prof. Irving Cameron (Canada); Prof. Sir Charles Scott Sherrington (Oxford); Prof. H. C. Jacobaeus (Stockholm); and Prof. K. F. Wenckebach (Vienna).

THE King of the Belgians has appointed Dr. Clement Clapton Chesterman, to be a member of the Commission for the Protection of Natives in the Belgian Congo. For the past eight years Dr. Chesterman has worked for the Baptist Missionary Society in this colony and has been in charge of the Yakusu Hospital.

CREMATION SOCIETY OF ENGLAND.—The annual report of this Society shows a satisfactory financial position. During the year 1926 2877 cremations were carried out at the 16 crematoria in Great Britain as compared with 2701 in the year 1925. Many improvements have been made at the various crematoria belonging to the Society, while a new building is now under construction in Arnos Vale Cemetery, Bristol, and the Guernsey States Committee have decided to erect a crematorium in that island. The report records the progress of the cremation movement abroad, and closes with an appeal for public support, for "notwithstanding the Society's financial stability, its resources at present are inadequate to provide space and trained staff to deal with the rapidly increasing volume of business."

HOSPITALS FOR COUNTY CORK.—When the health services throughout the Irish Free State were amalgamated a few years ago with county schemes most of the district hospitals were closed, and the hospital accommodation was concentrated into one or two hospitals in each county. While this might work well enough in many of the small counties, in large counties, such as Galway or Cork, it put grave hardships on the sick poor of many areas. This fault, in the case of Cork, is now to be remedied by the establishment of hospitals in no less than six additional centres—namely, district hospitals and fever hospitals at Macroom, Bantry, and Skibbereen, district hospitals at Kanturk and Clonakilty, and a cottage hospital at Bandon. At present there is a district hospital at Midleton, a surgical hospital at Fermoy, and a district hospital at Youghal. The calculated expenditure will be £100,000. Motor ambulances of an improved type have already been provided at Cork, Mallow, Fermoy, Clonakilty, and Skibbereen, and ambulances will be provided for the new hospitals when built.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH.—On March 22nd Dr. N. McLeod read a paper on abdominal pain and hyperalgesia. He divided the causes of pain in intra-abdominal disorders into two main groups—mechanical and inflammatory. In the first group were abnormal muscular movements of the gastro-intestinal tube, and different types of pain might be experienced in disordered peristalsis as compared with exaggerated peristalsis. He quoted cases of abdominal pain where such dragging on the peritoneum had occurred as a result of bands and adhesions but where the symptoms could only be explained as due to exaggerated muscular movements in the wall of the intestine. There were also cases in which dragging or adhesions to parietal peritoneum could definitely be assumed but in which no symptoms arose. In speaking of the inflammatory group Dr. McLeod discussed the production and the localisation of pain in local peritonitis, visceral and parietal. Apparently, he said, the viscero-sensory reflex was similarly disturbed in both varieties, but in the case of parietal peritonitis there was an additional factor—namely, the involvement of the cerebro-spinal nerve-endings in the extraperitoneal tissue by direct spread of inflammation. He concluded that in cases in which visceral peritoneum alone was involved the symptoms were those referable to the organ which was covered by the inflamed peritoneum, whilst in local parietal peritonitis pain was localised over the area of peritoneum affected.

A post-graduate course will be held by the James Mackenzie Institute at St. Andrews from June 14th to 28th. It will largely consist of lectures and demonstrations bearing on the recognition and treatment of disease in its early stages. The fee will be £5 5s. payable in advance to the Secretary, from whom further information may be obtained.

LISTER CENTENARY EXHIBITS.—A large collection of Lister relics was on view at the Wellcome Historical Medical Museum on April 4th and at an evening reception on the 7th. An excellent handbook illustrates the exhibition.

Dr. Frances Margaret Harper, late assistant medical officer of health at St. Helen's, is joining the medical staff at the hospital established in 1913 on the Ogowe River (French Equatorial Africa) by Dr. Albert Schweitzer. Dr. Harper was attached to the 2nd Malta Company of the Royal Army Medical Corps during the late war, and in 1922 went out to the Baptist Mission Hospital at Bolobo in the Belgian Congo.

DAVID LEWIS NORTHERN HOSPITAL, LIVERPOOL.—At the annual meeting the position of this institution of 225 beds was reported to be desperate. There is a debt of £20,000, the bank will lend no more because there are no further securities to offer, and the hospital site cannot be mortgaged because it was given by the Liverpool Corporation specifically for a hospital. Pending the fruition of the contributory scheme that has been decided upon the Lord Mayor has undertaken to make a special appeal to the city and neighbourhood.

TYPHOID FEVER IN MONTREAL.—According to the City Health Department the total number of cases of typhoid fever in Montreal since March 4th has been 1540. About 25 per cent. have sufficiently recovered to return to work. Cases have now appeared at Quebec. As a result of the Montreal epidemic, the United States laid an embargo on milk and cream imported from Canada. The Canadian Government is endeavouring to have the embargo removed from districts which have not shipped milk and cream to the United States for six months. Last year Canada exported milk and cream to the United States to the value of between £1,200,000 and £1,400,000.

LIVERPOOL CHILD WELFARE ASSOCIATION.—Some idea of the extensive and beneficent work of this association can be gained from the report which was presented at the annual meeting on March 31st. During last year 5000 applications for assistance were granted, 32,319 parents were helped, 30,000 visits were paid to homes where help was needed, and 2509 children were sent from congested city areas into the country for periods varying from three weeks to six months. In the infant welfare department there were 1308 attendances by expectant mothers, 22,914 by mothers and babies at the weekly consultations, and 334 at the new dental clinic. The bank overdraft stands at over £11,000. Parents contributed £4087, mostly in small sums, to the funds of the association.

BRITISH SOCIAL HYGIENE COUNCIL.—An extraordinary general meeting of the Council was held on 30th March (at Carteret House, Mr. E. B. Turner relieved later by Sir A. Newsholme) in the chair. Dr. David Lees and Mrs. C. Neville Rolfe reported on their recent four months tour in India. Dr. Lees had he said, been shocked to find how prevalent syphilis was in India; of the cases in one hospital in nine months, 30 per cent were syphilitic, and in a gynæcological clinic in which the blood of every patient was examined, 85 per cent were found to give a positive Wassermann reaction. Directors of public health, hospital medical officers, in fact the whole profession, had proved most ready to help in every way, and in conferences of medical men, held in the provinces visited, the profession's demands were formulated for the better treatment of venereal disease, including out-patient clinics at every hospital, with beds set apart in teaching hospitals, antenatal beds in maternity hospitals, special treatment at child welfare centres; provision for the treatment of merchant seamen, better teaching for students, opportunities for post-graduate instruction, the appointment of a specialist in venereal diseases on the surgical teaching staff of the Universities and free laboratory service to be provided available by the Government. Mrs. Rolfe related what had already been done. The Government had agreed to grant recreation grounds for merchant seamen, and they had asked for a physiological specialist to train head teachers next winter in the fundamentals of social hygiene, in order that they in turn might instruct the teachers in the provinces. The delegates were congratulated on what they had secured.

A summer school will be held at Keble College, Oxford, from August 3rd to 9th. A course of lectures on biology and social hygiene will be given by Prof. J. Arthur Thomson, and a course on psychology and social hygiene by Dr. H. Crichton-Miller. Applications for membership should be sent to the Secretary, at Carteret House, Carteret-street, London, S.W.1.

BOLINGBROKE HOSPITAL EXTENSION.—The 'William Shepherd" Memorial Wing of this hospital at Wandsworth Common was opened on Monday last by Mrs. H. Percy Shepherd, wife of Mr. Sheriff Shepherd, in whose father's memory it has been erected. The Lord Mayor and the Lady Mayoress opened the new operating theatre and Lady Carmichael the new Children's Ward, presented by her husband and herself, which will bear her name.

CARLISLE ROTARY CLUB.—On March 30th an address on the Lister Centenary was delivered before this Club by Mr. Norman Maclaren, surgeon to the Cumberland Infirmary. As recorded in the article reprinted on p. 774, Lister visited Carlisle in 1864 as the guest of Dr. Robert Elliot, first medical officer of the town, in order to become personally acquainted with McDougall's antiseptic method of sewage treatment. That by adopting this method the town sanitary authorities had suggested to Lister the principles which he afterwards applied to the treatment of wounds, was a fact, said Mr. Maclaren, of which Carlisle might well be proud.

A LEEDS POOR-LAW HOSPITAL.—The Leeds Guardians have approved an important scheme for extending the scope of hospital treatment at the Township Infirmary of 900 beds in Beckett-street. Consultants in aural surgery and gynæcology are to be appointed and will be paid three guineas a visit and five guineas for an operation. A radiologist will receive £250 a year, whilst it is proposed to elect three surgeons and physicians at £300 a year, to include all operations and visits. The resident staff will be increased to six assistant medical officers, the extra three to be advertised for at £200 a year. Paying patients are to be charged three guineas a week to cover all charges, including operations.

DONATIONS AND BEQUESTS.—St. Mary's Hospital, Manchester, have received the following legacies: £1000 from the executors of the late Mr. Anthony Willis, £753 from the executors of the late Mr. W. H. Beverley, and £744 from the executors of the late Mr. J. Parr. Mr. L. John Poingdestre Hacquoil, of Sambourne, Sneyd Park, Bristol, shipowner and coal exporter, of Cardiff, left the residue of his estate after various legacies, to his sister for life, and on her death, the ultimate residue—which will amount to about £40,000—to the Cardiff Royal Infirmary, now known as King Edward VII. Hospital. Mr. John Readhead, J.P., of Rockcliffe, South Shields, Durham, left £1000 to the Ingham Infirmary and South Shields and Westoe Dispensary. Mr. Henry Jones Evans, of Escuan Hall, Towyn, Merioneth, left £1500 to the War Memorial Hospital, Towyn.

THE LATE DR. A. G. WILKINS.—Dr. Arthur Godfrey Wilkins, who died on March 9th in his fifty-first year, was the son of the late Prof. A. S. Wilkins, of Manchester University. He was educated at Sedbergh and at Owens College, and graduated in medicine with honours in 1900. After holding several house appointments at Manchester and Salford, he settled in practice in Patterdale. During the 12 years he stayed there he lost no chance of gaining experience; engaging a locum, he would go away from time to time to hospitals or on voyages abroad, and in 1906 he was at Valparaiso during the earthquake. On the outbreak of war he sold his practice and joined the French Service de Santé. When the age-limit was raised he was granted a commission in the Royal Army Medical Corps and served first at Wimereux and later in East Africa. In 1918 he was nominated to the Egyptian Army, but he never went to Egypt as the war ended soon after the appointment was made. On his return to England Dr. Wilkins's health was impaired and private practice was out of the question. He became school medical officer to the Staffordshire County Council and did admirable work in the establishment and administration of clinics. After 18 months, however, he resigned his appointment, feeling that his organisation was as complete as he could make it. The next two years were spent in voyages as ship's surgeon to China and the East Indies. On his return he held appointments at Prestwood and Market Drayton Sanatoriums. His last post was that of medical superintendent of the Essex County Sanatorium, where his ability as an administrator was generally recognised. He had gained exceptionally wide experience, largely as a result of visiting every hospital, sanatorium, cripples' home, asylum, or clinic which it was possible to see in the course of his many travels in several continents. During the war he made a special study of anæsthetics and became an exceptionally able anæsthetist. He contributed to the literature of this subject. His health, unfortunately, proved unequal to the work at Harold Court, and he retired to the Isle of Wight. Dr. Wilkins leaves a widow.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, April 11th.—4.30 P.M., WAR. Annual General Meeting: Election of Officers and Council for 1927-1928. Paper: Major T. J. Mitchell, R.A.M.C.: Man Power and the Medical Service in Relation to some of the Principles of War. 8 P.M., ODONTOLOGY: Paper: Prof. Gottlieb (Vienna): The Gingival Margin.

TUESDAY—5.30 P.M., GENERAL MEETING OF FELLOWS: Ballot for election to the Fellowship.

ROYAL MEDICAL BENEVOLENT FUND, 11, Chandos-street, Cavendish-square, London, W. 1.

FRIDAY (to-day) April 8th—5 P.M., Annual Meeting of the Members.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY, April 11th.—5 P.M., Mr. C. E. Shattock: Joints.

NORTH-EAST LONDON POST-GRADUATE COLLEGE Prince of Wales's General Hospital, Tottenham, N.

MONDAY, April 11th.—2 P.M., Medical Cases in the Wards. 2.30 P.M. to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 P.M. to 5 P.M., Medical, Surgical, Throat, Nose, and Ear Clinics. Operations.

WEDNESDAY.—2.30 P.M. to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinic. 2.30 P.M. to 5 P.M., Medical, Surgical, and Ear, Nose and Throat Clinics. Operations.

ROYAL NORTHERN HOSPITAL POST-GRADUATE COURSE.

TUESDAY, April 12th.—3.15 P.M. (at the Royal Chest Hospital, City-road). Dr. H. B. Day: Diagnosis and Treatment of Bronchial Asthma.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, April 13th—4.15 P.M., Dr. J. C. Bramwell: Conditions Simulating Heart Disease.

ST. MARGARET'S HOSPITAL FOR WOMEN, Acomb-street, Whitworth Park, Manchester.

WEDNESDAY, April 6th.—12 noon, Mr. A. C. Magian: Demonstration Operation on Ovarian Tumours.

Appointments.

ERSKINE-GRAY, R., L.M.S.S.A., has been appointed Medical Officer to Chatham District Board of Guardians.

REID, W. J. S., M.A., B.Sc., M.D. Aberd., M.R.C.P. Lond., Honorary Physician Ancoats Hospital, Manchester.

Sheffield Royal Hospital: TOWNROW, V., M.B., B.S. Lond., F.R.C.S. Eng., Surgeon to the Ear, Nose, and Throat Department; BARRON, D. C., M.D. Edin.; WILLEY, H. L., M.B., B.Ch. Camb.; HOLDSWORTH, C. D., M.D., B.S. Lond.; PLEASANCE, R. E., M.D., Ch.B. Shef.; PAIGE, E. F., M.B., Ch.B. Shef.; reappointed Hon. Clinical Assistants: MACKINTOSH, K. D., M.B., Ch.B. Edin., D.P.H., Assistant School Medical Officer, Hull.

Salford Royal Hospital: DYSON, DOROTHY, M. L., M.B., Ch.B. Manch. and O'GRADY, MARGARET, M.B., Ch.B. Manch., Additional Anæsthetists. MACKENSIE, D. C., M.B., Ch.B. Edin., House Surgeon in the Orthopædic Department. WHITESIDE, E., M.B., Ch.B. Manch., House Surgeon. WOTHERSPOON, A., M.B., Ch.B. Edin., Medical Officer of Health for Stoke-on-Trent.

Certifying Surgeons under the Factory and Workshop Acts; GRIFFITH, W. R., L.R.C.P., L.R.C.S. Edin. (Clwt y Bont, Carnarvon); HILL A. H. C. (Calvert, Buckingham); MEGAW, W., M.B., B.Ch. Belf. (Audley, Stafford).

Vacancies.

For further information refer to the advertisement columns.

Ashington Hospital, Northumberland.—Jun. H.S. £100.

Beit Memorial Fellowship for Medical Research.—Fellowships.

Bethlem Hospital, Lambeth-road, S.E.—Two H.P.'s. £25 per quarter.

Birmingham and Midlands Eye Hospital.—Res. Surg. O. £150.

Burnley, Victoria Hospital.—H.S. £150.

Cambridge Addenbrooke's Hospital.—Cas. O. and Res. Anæsthetist. At rate of £130.

Central London Ophthalmic Hospital, Judd-street, W.C.—Hon. Anæsthetist.

Charing Cross Hospital, Institute of Pathology, 62-65, Chandos-street, Strand, W.C.—Asst. Pathologist. £560 for first six months.

Chester, East Lancashire Tuberculosis Colony, Barrowmore Hall, Great Barrow.—Asst. M.O. £250.
Chester Royal Infirmary.—H.S. £150.
Chesterfield and North Derbyshire Royal Hospital.—Hon. Ophth. S.
Derbyshire, Royal Infirmary, Derby.—H.P. and Asst. H.S., and Cas. O. Each at rate of £150.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.P., H.S., and Cas. O. Each at rate of £125.
Exeter, Royal Devon and Exeter Hospital,—Res. Cas. O. At rate of £100.
Gloucester, Standish House Sanatorium, Stonehouse.—Asst. M.O. £250.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Halifax Royal Infirmary.—Third H.S. At rate of £100.
Hampstead General and North West London Hospital, Haverstock Hill, N.W.—H.S., H.P., and Cas. M.O. Each at rate of £100.
His Majesty's Indian Medical Service.—Commissions.
Hospital for Consumption and Diseases of Chest, Brompton, S.W.—H.P.
Infants Hospital, Vincent-square, Westminster.—Pathologist. £600.
Ipswich, East Suffolk and Ipswich Hospital.—H.S., for Ear, Throat, and Nose Dept. £100.
Jerusalem, Ophthalmic Hospital.—Sub-Warden. Also Registrar.
Kent Education Committee, School Medical Service.—Dental S. £500.
Lancaster Borough.—Asst. M.O.H., &c. £500.
Leeds, Gateforth Sanatorium.—Res. M.O. £400.
Leigh Infirmary, Leigh Lancashire.—Res. H.S. £150.
London Hospital Dental School, Mile-End, E.—Demonstrator. £200.
London Hospital, E.—P. to Skin Dept.
Maidstone, Kent County Mental Hospital.—Asst. M.O. £300.
Manchester, Ancoats Hospital.—H.S. for Orthopædic Dept. At rate of £100.
Manchester City.—Asst. Tuberculosis O. £600.
Manchester, County Mental Hospital, Prestwich.—Asst. M.O. £350 to £450.
Middlesex County Council Dental Service.—Asst. Dental O. £500.
Miller General Hospital, for South-East London, Greenwich-road, S.E.—Out-patient O. £150.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Portsmouth, Royal Hospital.—Cas. O. At rate of £100.
Preston, Lancs., County Mental Hospital, Whittingham.—Sixth Asst. M.O. £350.
Prince of Wales's General Hospital, Tottenham, N.—Two Hon. Anæsthetists. Each £40.
Public Dispensary, 122, Drury Lane, W.C.—Res. M.O. £105.
Putney Hospital, Lower Common, Putney, S.W.—Res. M.O. £150.
Reading, Royal Berkshire Hospital.—H.S. £150.
Rochester, St. Bartholomew's Hospital.—Third Res. M.O. At rate of £175.
Royal Chest Hospital, City-road, E.C.—H.P. At rate of £100. Also Res. M.O. At rate of £150.
Royal College of Surgeons of England.—Examiners.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Non.-Res. Cas. O. £150.
Sheffield Royal Hospital.—Res. H.P. At rate of £80.
Stockton-on-Tees, Stockton and Thornaby Hospital.—Hon. S. to Ear, Nose, and Throat Dept.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
Ventnor, Isle of Wight, Royal National Hospital for Consumption.—Med. Supt. £1000.
West End Hospital for Nervous Diseases, 73, Welbeck-street, W.—Cas. P. £200.
West Ham County Borough.—Asst. M.O. and Maternity and Child Welfare. £600.

Births, Marriages, and Deaths.

BIRTHS.

COLDREY.—On March 28th, at Chatham House, Rotherham, Yorks, the wife of Eric Coldrey, M.D., F.R.C.S., of a son.
FULLER.—On April 1st, at St. Michael's Lodge, Winchester, the wife of C. B. S. Fuller, M.C., M.D., M.R.C.P., of a son.

MARRIAGES.

MACKAY—MACDONALD.—On March 25th, in London, George W. M. Mackay, M.A., M.B., Ch.B., to Catherine E. S. Macdonald.
MARTIN-WARD.—On April 2nd, 1927, at St. Thomas Church, Belfast, by the Very Reverend the Dean of Connor, Alexander Reid Martin, M.B., B.Ch. Belf., D.P.M. Lond., of Sheppard and Enoch Pratt Hospital, Baltimore, U.S.A., son of Mrs. C. R. Martin, Wilmont-terrace, Belfast, to Nancy, daughter of the late John K. Ward and Mrs. M. J. Ward, University-street, Belfast.
MILLS—GOODING.—On March 31st, 1927, at St. Thomas of Canterbury, Woodford Wells, by the Rev. Fr. Isidore McCann, O.F.M., John Mills M.B., Ch.B., only son of Mrs. S. E. Mills of St. Annes on Sea, Lancs., to Rita Gooding, daughter of Mr. and Mrs. F. C. Gooding of Buckhurst Hill, Essex.

DEATHS.

MACEWAN.—On March 31st, at his residence, 2, Airlie Place, Dundee, David MacEwan, M.D., C.M., LL.D., Emeritus, Professor of Surgery, University College, Dundee, in his 81st year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE CHRONIC RHEUMATIC DISEASES.*

BY CAREY F. COOMBS, M.D., F.R.C.P. LOND.,
PHYSICIAN WITH CHARGE OF OUT-PATIENTS, BRISTOL GENERAL HOSPITAL.

(Concluded from p. 741.)

Non-articular Manifestations.

WE will now take a brief glance at that last part of this survey to which the Ministry of Health's report gave the name "Non-articular manifestations." In this group are included muscular rheumatism and lumbago, and sciatica and brachial neuritis. To all these maladies the general term fibrositis is often applied. It must be confessed that we have but little direct evidence to support the hypothesis that this title assumes—namely, that the essential change is an inflammation of the fibrous investments of the muscles, or the nerve trunks, or both. That is the assumption, but there is little evidence, for the good reason that people never die of fibrositis and therefore give us little opportunity of seeing under the microscope exactly what it is that happens in an attack of lumbago or stiff neck. It is wonderful how little is known about disease of voluntary muscle. I suppose the voluntary muscles are responsible for at least one-tenth of the total body-weight, and yet less than one three-hundredth part of what may be regarded as the best modern text-book of medicine in our language is devoted to diseases of those same muscles.

As a link between these muscular inflammations and the rheumatic infections of childhood, we ought to take note of the fact, that the pains of the rheumatic child arise in muscles nearly as often as they do in joints. Stiff neck, for example, of an unmistakably muscular type may be accompanied in the child by fever and the development of heart disease, proving almost beyond controversy that the muscles of the neck have been invaded and irritated by bacteria. Indeed, I have actually seen with the microscope patches of inflammatory reaction in the muscles surrounding the elbow-joint of a rheumatic child. Similar inflammatory patches, almost certainly bacterial in origin, have been found in the muscles and intermuscular tissues of persons with fibrositis. Moreover, even when there is no opportunity of seeing these patches they can sometimes be felt in the form of inflammatory nodules perceived by the fingers of the observer to lie in the depths of the muscles. In sciatica, again, an inflammation of the fibrous sheath of the great sciatic nerve has actually been seen to occur. There are, therefore, a number of odd scraps of evidence which justify the existence of that useful though etymologically indefensible term "fibrositis." This complaint that we are discussing, muscular rheumatism, with its near relatives sciatica and brachial neuritis, proved to be the commonest of all the forms of rheumatic troubles investigated by the Ministry of Health Committee. The figures of their report indicate that if we take a sample group of the insured population we shall find nearly 2 per cent. of the men, and more than 1 per cent. of the women disabled by complaints that it will be convenient to group together as "fibrositis." This brings graphically before us the new point of view in medicine. Formerly the chief motive power of preventive medicine was pity for the sufferings of others. Now, however, there is added to this a concern for our own pockets, out of which is taken the money on which these disabled persons are to live. I must confess to a certain distaste for this motive, and prefer to assume that in our zeal for the abolition of fibrositis we are full of the best intentions, and prepared, for the sake of preventing suffering, to deprive countless spas, physiotherapeutic institutes, and liniment manufacturers of their means of livelihood.

How to abolish Fibrositis.

How are we going to set about it? In the first place, fibrositis is clearly a malady of maturity, as the Ministry of Health's figures show. This is so generally recognised that even one of His Majesty's judges—who do not, as a rule, display their knowledge of medicine with any confidence—remarked the other day that we are all more or less rheumatic after 40. The influence of sex is curious and exhibits some cross currents. Sciatica is commoner in men, brachial neuritis in women. Some families are more liable to these complaints than others, and occasionally this vulnerability appears, like that of the gouty family, to depend on a

* Lectures on the Causes and Prevention of Rheumatism, delivered under the Chadwick Trust. The first lecture appeared in two instalments in THE LANCET of March 12th and 19th. The second lecture (the first half of which appeared last week) was given on March 10th, 1927.

familial incapacity to utilise certain foodstuffs. "One man's meat is another man's poison"; and butcher's meat in general, beef in particular, appears to have a toxic effect on some individuals, an effect which may express itself in the form of muscular pains apparently of rheumatic type. In some cases, again, these affections of the fibrous sheaths of muscles and nerves are actually and directly due to gout.

Such simple everyday influences as strain and chill play a part that cannot be denied in precipitating attacks of fibrositis. In both cases it is to be presumed that what happens is the production of some small injury to a muscle or its fibrous sheath which gives to vagrant microbes a spot in which to settle and multiply. In much the same way we may explain the action of fatigue, which may either precipitate the acute forms or perpetuate the chronic types of fibrositis.

Another influence that cannot be denied is oral sepsis. Here again we have to preserve our balance, but without doubt there is a connexion between the two. In my own experience this connexion has appeared to be occasional, and not invariable as in the view of some. It is so easy to advise the removal of teeth, but impossible to put them back again, and one's sense of proportion is outraged by wholesale extractions advised for the cure of something which they may fail even to relieve, something which is, after all, nothing more than an inconvenience in most cases.

Further, the value of morale is seen nowhere, in time of peace, more plainly than in the reaction of different persons to the pains of muscular rheumatism; one might even say to all forms of chronic rheumatic pain. At one end of the scale you have the woman who endures heroically the sufferings and limitations of a rheumatoid arthritis; refuses to be tied down to her chair or bed by it; and incidentally escapes the curse of excessive treatment. She is often rewarded by an improvement in her condition; and, at worst, succeeds in enjoying life and maintaining her sense of well-being. At the other end of the scale is the man who turns with no great reluctance from his work, at the first shock of muscular pain; either to his panel doctor for a certificate or to his spa for a pleasant holiday. If we are out on an errand of mercy in our endeavour to prevent those painful maladies, we do well; but if it is merely an economic proposition, as much good might be done by directing our attention to the morale of the public as to its physique.

A Review of the Position.

And now we are in a position to look back on the whole field over which we have rapidly skimmed. We have reviewed the various conditions that may legitimately be called rheumatic, and in a certain order chosen deliberately because it has passed from the known to the less known; from that which is dangerous to that which is serious, and so on to that which is merely inconvenient. The diseases we have discussed overlap a good deal more than I have been able to show in so brief a review, both in their symptoms and in their causes. For example, the division of these chronic forms of joint disease into rheumatoid arthritis is no more fundamental than a division of the white race into blondes and brunettes. The boundary is not a sharp line; it is a blurred zone fading off gradually on either side towards the contrasting extremes. Examples of joint disease are met with which represent every shade of combination of the qualities of osteo-arthritis at one end of the scale and rheumatoid arthritis at the other. When the degenerative or senile factor is in the ascendancy, the result is a lesion of the joint that approximates to the osteo-arthritic type. On the other hand, the more obvious the microbic influence the more nearly rheumatoid the lesion. The relation between these two great subdivisions of chronic rheumatic disease is therefore very definite.

But when we turn to those forms of rheumatic disease which affect muscles and nerve-sheaths—conditions which we have agreed to include within the term "fibrositis"—there is far less reason to connect them with the joint troubles that we have just been discussing. Only broadly may we say that the same influences that are responsible for troubling the joints are also often to be detected in the act of causing these muscular pains also. Recent work has stressed the microbic element, to which I have already alluded, in the provocation of the various forms of fibrositis as well as in that of the chronic joint disorders of which I have spoken.

Need of Organised Inquiry.

Indeed, we are in some danger of coming to treat every one of these rheumatic disorders as the expression of what has been well named "subinfection"; infection—that is, by micro-organisms that do not ordinarily succeed in doing any damage, though they are continually present on the mucous surfaces of the body. That this "subinfection" does, indeed, play its part in all forms of rheumatic trouble is almost certainly true, and the recognition of this marks a great step forward. But it is obvious to everyone that it is by no means the whole truth. For, if all these maladies are merely expressions of the fact that organisms of a low virulence have got into our joints and muscles, how is it that in one patient the result is a rheumatoid arthritis, in another, sciatica? It is clear that between the spot at which the microbe enters the body, and the site of the crippling that it produces, a whole host of causal agents must come into play, differing in one person from those of another, as heredity and environment differ. Somehow or other we have to study these influences and disentangle them from one another. This is so hard a task that we cannot wonder at its unpopularity. It is so much easier to say that the disease is due to septic teeth, and to have those teeth removed, especially when they happen to be someone else's teeth. It is here that the inquiry made by the Ministry of Health shows us a more excellent way, and it is much to be hoped that the example which it has set, of voluntary coöperation between a number of doctors in study of the causes of the rheumatic group of diseases, will be imitated and elaborated. The organisation of such work as this is no light matter. It demands a combination of enthusiasm with patience which is not always to be found. Yet I believe we have come to a point in the war against disease beyond which it is impossible to progress except by united action, into which the several branches of our profession may be led but not driven, persuaded but not dragooned. It is possible that when all has been done, and every kind of chronic rheumatic trouble subjected to a minute analysis it will lead to nothing but the simplest and most elementary conclusions. It may even reduce the campaign for the prevention of chronic rheumatic disease to nothing more dignified than a restatement of Longfellow's couplet:—

"Joy and Temperance and Repose
Slam the door on the doctor's nose."

The fact is, that thanks largely to the labours of Sir Edwin Chadwick and his associates, we are no longer facing the same enemies as he did. The shock troops of disease, the bacteria of typhus, plague, cholera, and the like, have made their attack and been thrown back in disorder. Now we have a different kind of enemy, the saprophytic micro-organisms who infest the normal body. These have settled down to a long war, a war of attrition, on which we must bring to bear the same principles that have won such signal victories over acute disease. We saw at the beginning of this address that as against the acute infections, so also against these chronic rheumatic diseases, the campaign opened with a classification of the various kinds of disease based on discrimination between their symptoms. After this comes inquiry into the respective causes of the different groups. So far as the chronic rheumatic diseases are concerned we are still in that stage. As the knowledge of these causes is gained, bit by bit, so it will be diffused; and in the end it is by the spread of knowledge of causes that disease is prevented.

A SCHEME FOR COPING WITH INFLUENZA EPIDEMICS.

OWING to the serious character of the influenza epidemic in South Africa in 1918, the Union health authorities have recommended that precautions should be taken to prevent a similar occurrence following on the present European epidemic. Our South African correspondent has informed us that several of the municipalities have set out schemes of procedure; the details of one of these schemes deserves attention.

In Cape Town members of the local branch of the Medical Association of South Africa, the St. John Ambulance Association, South African Trained Nurses' Association, Royal Automobile Club, Women's Municipal Association, Boy Scouts, Girl Guides, and other kindred bodies have been asked to coöperate in organising medical and other services in the city in the event of an outbreak of influenza. The Council of the Cape Western Branch of the Medical Association of South Africa (B.M.A.), have recommended the following measures:—

Organisation of Medical Profession.—It has been arranged for an organising medical secretary to prepare in detail the following scheme: (*a*) the subdivison of the municipal area into districts; (*b*) the appointment of a medical commandant for each district; (*c*) the collaboration of medical men in each district with its respective commandant: (*d*) a roster of emergency medical men, drawn from specialists, retired doctors, medical students, &c., for emergency work in districts reported by commandants as requiring assistance; (*e*) methods of communication between depôts arranged by the City Health Service and the commandants for the supply of nursing service, guides, drugs, food, &c. The organising medical secretary would be, with his organisation, at the service of the medical officer of health.

Publicity.—The following avenues of reaching the public were recommended: (*a*) the Press and the medical association to coöperate with the City Council in publicity measures

at the discretion of the medical officer of health, (*b*) Public lectures. It is suggested that public lectures be given by the medical officer of health, and others. (*c*) The broadcasting of such lectures should be arranged. (*d*) The general contents of leaflets have been discussed and agreed upon by the council. (*e*) The coöperation of teachers to be asked in distributing advice. In view of the impossibility of forecasting the extent and duration of any epidemic, it was decided to draw up no hard-and-fast scheme of propaganda, but to use the above as exigencies demanded.

Drugs.—Formulæ to be known as aperient, febrifuge, and expectorant have been adopted for extreme emergency use. The formulæ have been so drawn as to ensure chemists having no difficulty in obtaining the necessary ingredients. A suitable vaccine for use as a prophylactic in influenza should be available. The Council of the Cape Western Branch concludes the memorandum by assuring the City Council of its hearty coöperation, and its willingness to discuss any further measures in which the City Council considers it may be of assistance.

Organisation of Trained Nurses.—Representatives of the Trained Nurses Association have reported that a list could be prepared of members who were not actually employed in hospitals or private practice, and who would be available to assist at temporary hospitals. They suggest that in case of emergency it would be well if trained nurses could be allotted from the hospitals by the Cape Hospital Board as an emergency measure until such time as the other members are ready to take their place. In regard to partly trained nurses (by which they meant members of the St. John Ambulance Brigade, Ambulance and Nursing Divisions), lists were available, and it was proposed to ascertain further the names and addresses of those V.A.D.'s, who had returned from military service but were not attached to the St. John Ambulance organisation. It was also recommended that house-to-house visitation should be carried out under the control of district nurses, assisted by V.A.D.'s, and untrained voluntary helpers, and it was urged upon the Health Authorities to support an increase in the number of district nurses throughout the Peninsula.

OCCUPATIONAL ANALYSIS.

THE principle of vocational selection is being more and more extensively adopted by manufacturers as the most logical way of increasing the efficiency of their staff. Each applicant for work, in the organisations which have adopted the principle, is subjected to a psychological test to discover the direction in which his capabilities lie, so that he may be allotted to the task for which he is most fitted. The supplementary principle of vocational guidance is also gaining ground, and many local educational authorities are actively superintending their pupils' absorption into industry. Both selection and guidance must, however, depend on an accurate knowledge of the available occupations in terms of the demands they make on human physique and temperament, and the study of the worker has undoubtedly outstripped the study of the work. Detailed psychological descriptions of industrial processes have been practically unobtainable, and advisers have either made their own researches into a few of the industries with which they were most concerned, or have relied on the very crude material which has hitherto been at their disposal. The National Institute of Industrial Psychology has now for some time been experimenting with a view to meeting this demand, and in the first report [1] of their vocational section they illustrate, with full instructions and specimens, a scheme by which information on the myriad existing industrial processes can be standardised. Given a satisfactory standard form and notation, it will be comparatively easy to form a pool to which advisers will be constantly adding and from which in time everyone will be able to draw the information he wants. As an illustration of their thoroughness may be taken the sample on laundry work. This industry is divided into eight processes: collecting, receiving, sorting, washing, calendering, ironing, packing, and delivery. Form A, a broad description of the occupation, contains general information and notes on the special features, for instance—Prospects: "At eighteen or earlier the girl is given an opportunity to learn hand ironing under a skilled worker. It takes a girl from one to three months to reach proficiency. Some laundries have regular training schools. Prospect of promotion is fair for the more skilled classes of worker, including fine ironers and machinists, from whom the forewomen are recruited." Each process is described on a separate form. A calender, for example, is a machine which dries and irons in one operation, and of a calender feeder the following psychological qualification is demanded: "Manual skill: chief hand and arm movement is $t_2 f_2$ [1 2 3] Se, R. & L. (i.e., thumb and first three fingers of both hands are employed in gripping; arms are bent and elbows free). Touch control. Also elbow movement similar to that of press work. Accuracy of large movement C. Speed C+. Temperament calm, equable, no objections to monotonous work. Experience." Armed with this report, a vocational adviser will be able to repair to a factory or workshop and obtain exactly the information he requires in the shortest possible time, and will have a common language in which he may read the experience of any other adviser. The pamphlet marks a great step forward in the application of psychological knowledge to industry.

[1] Institute Report, No. 1, 329, High Holborn, London, W.C. 2*s*.

ARSENIC AND APPLES.

THE following is quoted from a letter written by the Acting Secretary of the United States Department of Agriculture at Washington, in answer to a communication from the London Vegetarian Society, asking whether anything is now being done by American fruit-growers to prevent the contamination of apples by arsenic. [Vide THE LANCET, 1926, i., 824, and ii., 81].

"Intensive studies designed to control the spray residue on fruit were made during the last producing season by both Governmental and commercial agencies. While a great improvement in the condition of the crop was brought about, it was found that in certain areas of low rainfall, even the most careful restriction in the application of sprays, followed by brushing and wiping the fruit after harvest, left excessive quantities of residue on the fruit. This demonstrated clearly the necessity for employing other methods of removing spray residues than by brushing or wiping. Experimental work conducted last season in a number of localities where spray residue may be excessive at the time of harvest has shown that by the employment of certain dipping methods the fruit may be cleaned to a point where the amount of residue will be well below the recognised tolerance. Steps are now being taken to advise the fruit producing industry in those regions where fruit cleaning is essential, of the equipment and processes necessary in the application of these different methods and everything possible will be done to bring about the installation of this equipment before the next packing season. It is expected that as a result of the combined effort of the fruit producing industry and interested governmental agencies, none of the fruit exported to Great Britain during the coming season will bear objectionable quantities of spray residue."

The full text of the letter is being published in the *Vegetarian News* for April.

SOLLUX PAPERS ON U.V. THERAPY.

THE Sollux Publishing Company have issued a collection of papers by well-known German writers dealing with ultra-violet therapy. Some of them have been published before and the theories advanced may not fully represent the writers' present views; as working hypotheses, however, they are still valid. Dr. Hans L. Heusner is opposed to the view generally held in this country that U.V. rays are to be avoided in pulmonary tubercle. An analysis of 86 replies in response to a questionnaire which he circulated convinced him that there were "practically no unfavourable results," though in many cases improvement might have been slight. U.V. treatment in phthisis has analogies with tuberculin treatment and demands a similar degree of caution; no good can be expected from massive doses and all exposures should be under the personal supervision of the physician in charge. Heusner expresses the hope that, as a result of improved U.V. treatment of early cases the sanatoria may be reserved for the more advanced cases with positive sputum. Hugo Bach testifies to the value of U.V. rays from whatever source in the treatment of war wounds, particularly when septic; he describes their disinfectant, deodorising, and drying effect and attributes these properties to local stimulation as well as to a general increase of metabolism. The reprint of Huldschinsky's well-known paper on U.V. treatment of rickets contains abundant proof of the value of the rays in combating the severe post-war rickets amongst the children of Central Europe. It is perhaps going too far to suggest that every child, whether showing signs of vitamin deficiency or not, should be given U.V. treatment in infancy as a matter of routine. Of a more speculative nature are the papers by Profs. G. A. Rost and A. Jesionek. After pointing out the fallacy of Finsen's original idea of a direct action of U.V. rays on the tubercle bacilli in lupoid tissues, Rost suggests that the effect is due to "primary" and "secondary" tissue reactions in response to the absorbed radiation. In disagreement with Rollier and Jesionek, Rost is against the development of pigmentation as a desirable sign of progress under U.V. treatment, and, while not disputing the excellent results obtained in many patients who pigment, considers that equally good or better results can be obtained without pushing dosage to the point of pigmentation, a process which he regards as a natural defence against the penetration of the U.V. rays. Erythema, on the other hand, he regards as essential to treatment and, as pigmentation is preceded in most cases by marked erythema, he finds therein the explanation of the good results reported with pigmenting doses.